

OPERATION  
AND  
SERVICE  
MANUAL  
FOR  
AUTOCLAVES  
MODELS EA, EKA

LK1



TABLE-TOP AUTOCLAVE's  
Electronic models EA & EKA  
Operation and Maintenance Manual

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*EA,EKA 04700001A*

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***Drawings***

*Piping Diagram EA, EKA*

*Electric Wiring Diagram 2340, 2540 EA, EKA*

## **INCOMING INSPECTION**

The autoclave should be unpacked and inspected for mechanical damage upon receipt. Observe packing method and retain packing materials until the unit has been inspected. Mechanical inspection involves checking for signs of physical damage such as: scratched panel surfaces, broken knobs, etc.

If damage is apparent, contact your dealer or point of purchase, so that they may notify the manufacturer and file a claim with the appropriate carrier.

All **Tuttnauer** products are carefully inspected prior to shipment and all reasonable precautions are taken in preparing them for shipment to assure safe arrival at their destination.

## **WARRANTY STATEMENT**

Your **Tuttnauer** autoclave is of high quality manufacture. If you have any difficulty concerning operation, and the solution is not covered in the maintenance manual, please contact the dealer where the unit was purchased, or our customer and technical service departments. Do not attempt to service this instrument yourself. The warranty registration must be completed and returned to **Rudolf Gunz & Co**; with fourteen (14) days of purchase or the warranty will be void.

## **WARRANTY - PARTS**

We hereby certify that this autoclave is warranted to be free from defects in material and workmanship for two (2) years against faulty components and assembly.

Our obligation is limited to repairing or replacing the autoclave or parts, after our examination, if within two (2) years after the date of shipment they prove to be defective.

## **WARRANTY LABOUR**

**Tuttnauer** will cover all labor costs for a period of one (1) year after the date of shipment as long as said labor is performed at our factory and is related to a warranty repair. This warranty does not apply to any improper installation or application; nor shall it extend to products which have been altered outside the factory without prior authorization from us; nor products which have been improperly maintained. No products will be accepted for repair without proper authorization from us. All transportation charges must be paid both ways by owner. This warranty will be void if unit is not purchased from an authorized full service **Tuttnauer** dealer.

**NOTE** :If there is any difficulty with this instrument, and the solution is not covered in this manual, contact us or our representative first. ***Do not attempt to service this instrument yourself!*** Describe the difficulty as clearly as possible so we may be able to diagnose the problem and provide a prompt solution.

If the autoclave is equipped with a printer, send along copy of the last printout for our inspection. If replacement parts are needed, stipulate the model and serial number.

## **1. GENERAL INFORMATION**

### **1.1 INTRODUCTION**

This table-top autoclave is designed for the sterilization of medical and surgical instruments in dental, medical and veterinary clinics, first aid rooms, laboratories etc.

The autoclave models EA and EKA are electrically - heated sterilizers of different dimensions, using steam as the sterilizing agent. The autoclave is controlled by a computerized control unit ensuring a fully automatic sterilization cycle and precise control and monitoring of physical parameters and a clear documentation of the sterilization cycle. Three automatic programs are available, according to the material to be sterilized. The difference between EKA is the air compressor which during the dry cycle, pushes filtered air (0.2N) through the chamber to pull out the humidity, the dry operation being performed with the closed door.

The control system provides adequate protection, to ensure the safety of personnel and reliable operation with a minimum of down time.

This manual is intended to give the user a general understanding of how the autoclave works and indicate the best ways to operate and take care of it in order to obtain optimum results and a trouble free operation. However, since the autoclave is built using high technology sensitive components, no attempt should be made by the user or any other unauthorized person to repair or re-calibrate it.

Only technical personnel having the proper qualifications, and holding the technical documentation and adequate test instrumentation, are authorized to service the instruments.

### ***Operation Condition***

This device is to be used for indoor use.

The sterilizer should be loaded only with autoclavable material!

Room temperature: 5°C to 40°C.

Maximum relative humidity: 80% for temperatures up to 15% decreasing linearly to 50% relative humidity at 40°C.

**1.2 TECHNICAL SPECIFICATIONS (FOR E, EK, EA, EKA MODELS)**

<i>Specifications of models....</i>	<i>Chamber dimensions Dia x D</i>	<i>Volume of usable space</i>	<i>Overall dimensions W x D x H</i>	<i>Tray dimensions W X D X H</i>	<i>No. of trays</i>	<i>No. of IMS cassettes</i>	<i>Printer</i>	<i>Shipping Weight</i>	<i>Shipping Volume</i>
1730	17 x 34 cm (6.7" x 13.4")	7.5 l. (2 US gal.)	44 x 45.5 x 30.5 cm (17.4" x 17.9" x12")	12 x 29.5 x 2 cm (4.7" x 11.6" x0.8")	3	-	N/A	29 kgs. (64 lbs.)	0.18 m <sup>3</sup> (6.35 cu.f.)
2340	23 x 47 cm (9" x 18.5")	19 l. (5 US gal.)	51 x 54.5 x 36.5 cm (20" x 21.5" x 14.4")	17 x 41.5 x 2cm (6.7" x 16.3" x0.8")	3	2	Optional	40 kgs. (88 lbs.)	0.27m <sup>3</sup> (9.4 cu. f.)
2540	25.4 x 47.5cm (10" x 18.7")	23 l. (6 US gal.)	51 x 54.5 x 36.5 cm (20" x 21.5" x 14.4")	17 x 41.5 x 2 cm (6.7" x 16.3" x0.8")	4	3	Optional	41 kgs. (90 lbs.)	0.27m <sup>3</sup> (9.4 cu. f.)
3850	38 x 58 cm. (15" x 23" )	65 l. (17US gal)	66 x 69 x 52 cm (26 "x 27" x 21")	28 x 50 x 2.5 cm (11" x 20 " x 1" ) 35 x 50 x 2.5cm (14" x 20 " x 1")	2	11	Optional	74 kgs. (163 lbs.)	0.63 m <sup>3</sup> (22.2cu.f.)
3870	38x76 cm (15" x 30 ")	84 l. (22 US gal )	66 x 87 x 52cm ( 26" x 34" x 21" )	28 x 67 x 2.5cm ( 11" x 26" x 1" ) 35 x 67 x 2.5 14" x 26" x 1"	2	15	Optional	79kgs. (174 lbs.)	0.76m <sup>3</sup> (26.8cu.f)

**ELECTRICAL DATA:**

	1730		2340		2540		3850	3870
	EA	EKA	EA	EKA	EA	EKA	EA	EA
<b>VOLTAGE</b>	<b>230 / 240V</b>							
AMPS A	4.6	5.9	6	9.6	6	9.6	10.4	13
WATTS W	1050	1350	1400	2200	1400	2200	2400	3000
Frequency	<b>50 / 60 Hz</b>							

**STANDARDS :**

Every autoclave meets applicable requirements of the following standards carries an appropriate symbol and is submitted with documentation.

1. A.S.M.E. Code, Section 8 Division 1 for unfired pressure vessels.
2. Underwriters Laboratories (U.L.)
3. Canadian Standard Association (C.S.A.)
4. EN/IEC/VDEelectrical requirements.
5. GS "Geprufte Sicherheit" Germany for safe performance.

**SYMBOL DESCRIPTION**



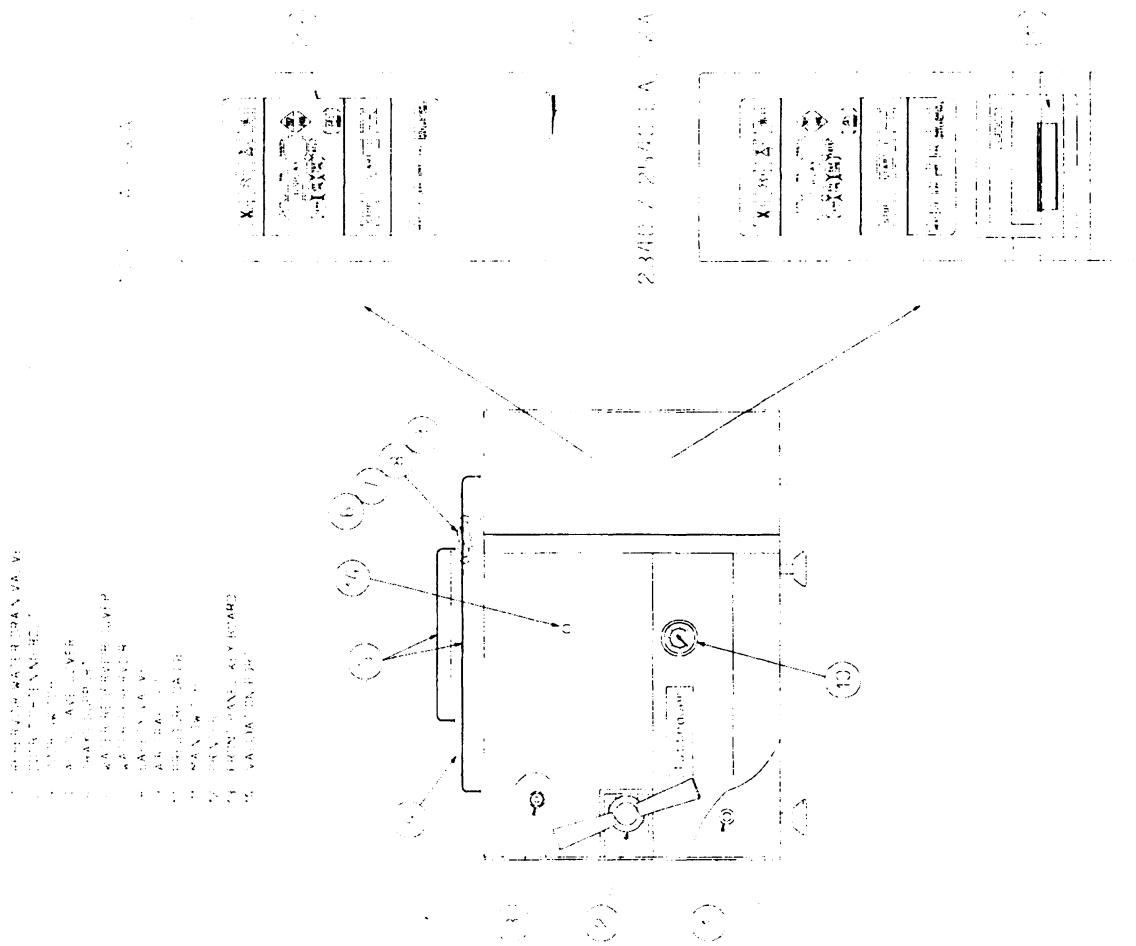
*Caution! Consult accompanying documents.*



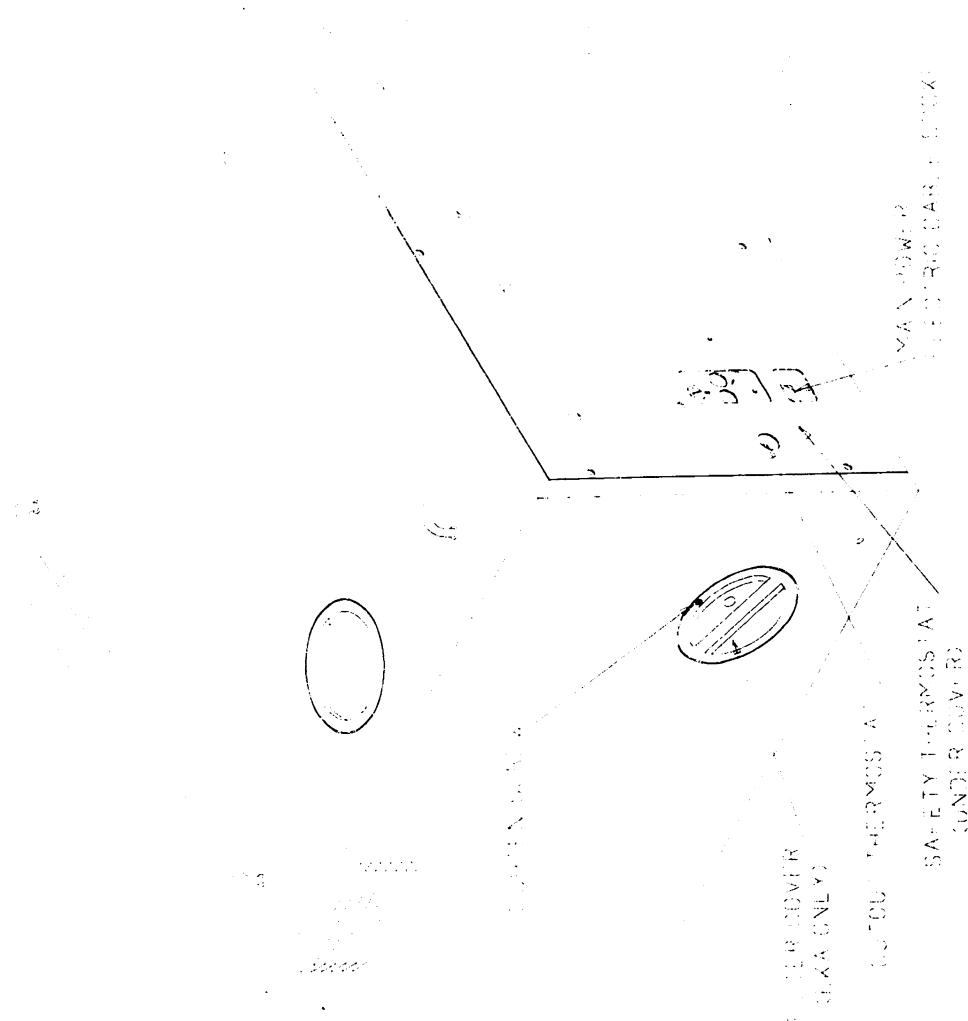
*Caution! Hot Surface.*

## FRONT VIEW

FIGURE 2. FRONT VIEW OF THE APPARATUS.



## REAR VIEW



#### **1.4 DESCRIPTION AND FUNCTIONS OF THE FRONT PANEL KEYBOARD**

Pressing one of the programme keys determines the chosen program. The programme preset parameters will be displayed and the programme indicator will be illuminated.

(1) UNWRAPPED INSTRUMENTS (without drying stage )

(2) WRAPPED INSTRUMENTS (with drying stage )

(3) LIQUIDS (slow exhaust )

(4) DRY ONLY

Pressing this key allows inclusion of the Additional Drying procedure for a period of time determined by the operator. Time range is 0-99 minutes.

(5) TEMP

Pressing this key displays the set temperature of the selected program. To raise or lower the program's sterilization temperature, press the UP/DN keys. The new value will be stored in memory as the nominal setting. The permitted temperature range for proper sterilization is 220°F - 278°F (105°C-137°C).

(6) STE TIME

Pressing this key displays the sterilization time of the selected program. Pressing the UP/ DN keys will increase or decrease the program's sterilization time and the new value will be stored in memory as the new nominal setting. Time range is 3-59 minutes.

(7) DRY TIME

Pressing this key displays the dry time of the selected program. Pressing the UP/DN keys will increase or decrease the programs dry time and the new value will be stored in memory as the nominal setting. The time range is 0 - 99 minutes.

This key does not allow any change of the dry time for the liquids program, for which it is permanently set to 00 minutes.

(8) UP/DN

Pressing these keys, after pressing the TEMP (5), STE (6), DRY TIME (7),or CLOCK (10) will raise or lower these values, accordingly.

(9) CLOCK

Pressing the CLOCK programming key first displays the date with the cursor under the day. Pressing the UP/DN keys will change the date. Pressing the CLOCK key once again will move the cursor underneath the month and then the time (hr. minute year. second.) The UP/DN keys therefore allows change of values. At this point the display will show the currently set date and time. If no key is pressed during a 10 second interval, the system exits the clock programming mode and returns to the settings.

(10) INLET

This key allows a MANUAL OPTION of filling the chamber with water, by continuously applying pressure to this key. The valve closes once the key is released.

(11) START

Pressing this key will start the sterilization, (or, DRY ONLY ) process according to the selected programme. Water will AUTOMATICALLY flow into the chamber, HEAT and STE stages will commence and the respective LED indicator will light.

At the proper completion of the sterilization programme the indicator will be extinguished and the display will return to its previous screen. The process will not start if:

- The door is not closed, the DOOR CLOSED indicator is turned OFF and the message DOOR UNLOCK is displayed.

*NOTE : Due to the inherent elasticity of the door gasket, the close door indicator may be illuminated green before a complete seal is made between the door and the chamber. Therefore, in order to ensure that the door is fully sealed, tighten the door bolt until "hand tight". Do not over-tighten the bolt as this may result in damage to the gasket.*

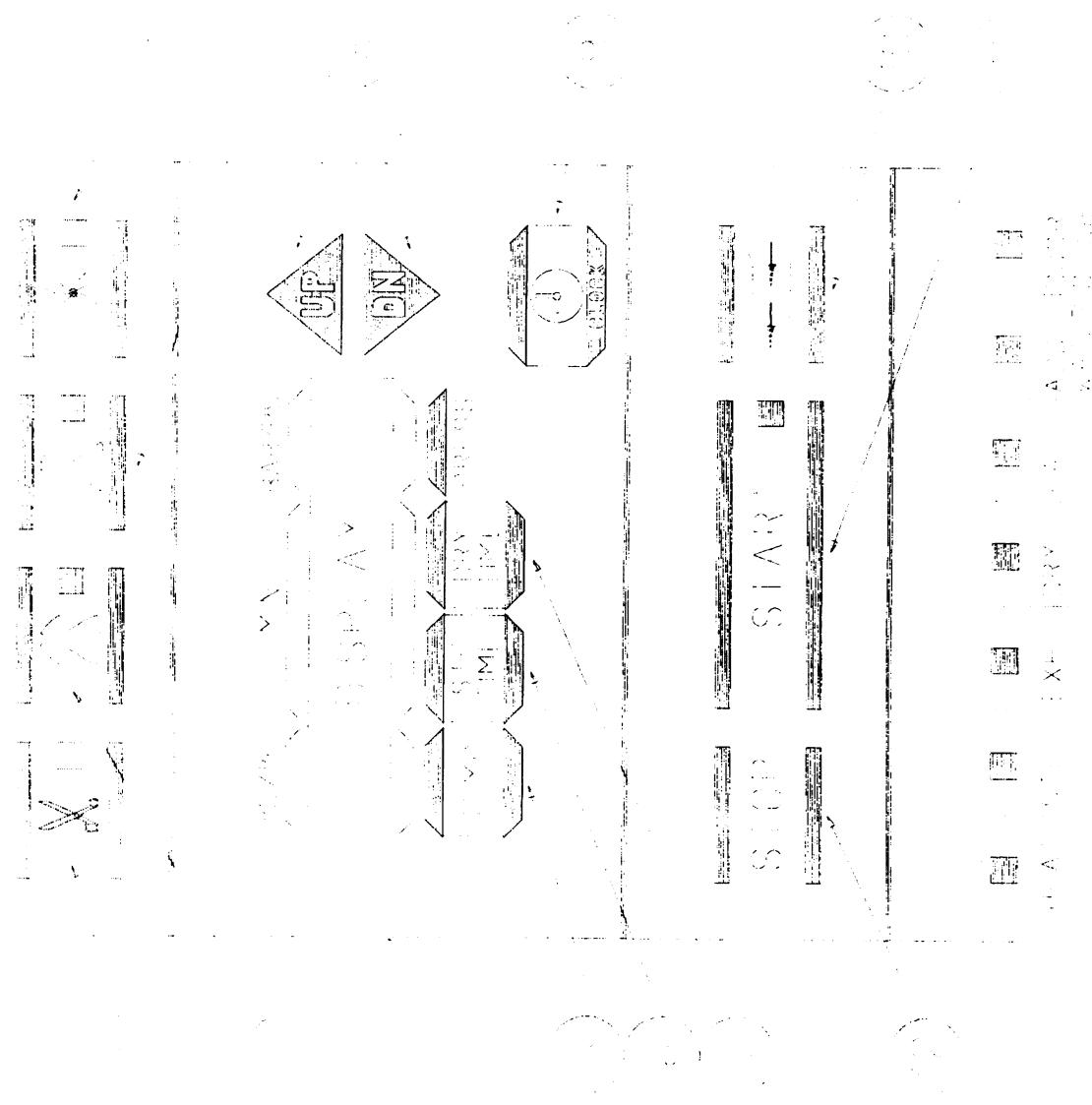
*Should the autoclave fail to reach sterilizing temperature/pressure , always check first that the door is fully sealed. If not, tighten the door further, as described above, until completely sealed.*

- There is not enough water in the reservoir, (in which case the red WATER indicator will light and the relevant message will be displayed).

(12) STOP

This key issues the only command accepted by the system during running of a programme. Pressing this key for over 1 second will cause the programme to cease and the MAN. STOP message displayed on the screen. This key does not function when the system is not in operation and its only use is to manually terminate a cycle. In normal working conditions on completion, the system automatically terminates the cycle, without use of this key.

## FRONT PANEL KEYBOARD



### **1.5 INDICATOR LIGHT DESCRIPTION**

PROGRAM	Shows the selected programme (1,2,3,4).
START	Shows the system is running a programme (11).
HEAT	The system is in the HEATING stage. The indicator flashes during the STANDBY- low power heating to keep the chamber hot.
STE	The system is in the STERILIZATION stage
EXH	The system is in the EXHAUST stage
DRY	The system is in the DRYING stage
FAIL	The system has failed as the result of either a protective cutoff, or the STOP key was depressed. A message indicating the nature of the failure will be displayed on the screen.
ADD WATER	There is a shortage of water in the water reservoir.
DOOR CLOSED	Indicates the door is closed.

*NOTE: Due to the inherent elasticity of the door gasket, the close door indicator light may be illuminated green before a complete seal is made between the door and the chamber.*

*Therefore, in order to ensure that the door is fully sealed, when the green light has been illuminated continue to tighten the door bolt until "hand tight". Do not over-tighten the bolt as this may result in damage to the gasket.*

*Should the autoclave fail to reach sterilizing temperature / pressure, always check first that the door is fully sealed. If not, tighten the door bolt further, as described above, until a complete seal is made.*

### **PRESSURE GAUGE**

The pressure gauge is provided as a guide only. Should there be a power failure during the operation of the autoclave, the pressure gauge indicates to the operator that there is pressure in the chamber. A deviation of  $\pm 0.2$  Bar (3 psi) is normal.

## **1.6 DESCRIPTION OF THE DISPLAY PANEL**

The display is comprised of 16 characters in one row and is divided into 4 sections. The first section to the right, continuously shows the actual current pressure within the chamber. This happens whether the system is running a programme or not (provided the main power switch is turned on).

The three other sections are designated to show the parameters of the selected programme, or operating messages. When the system is running a sterilization programme, the sterilization temperature will be displayed above the TEMP key. Sterilization time will be displayed above the STE TIME key and the drying time for the selected programme will be displayed above the DRY TIME key.

If the programme aborts as a result of a programme check,(high, low pressure or temperature etc.) or a manual STOP command, the message will be displayed on the left side of the screen. When a message is displayed, pressing any key will erase the message and redisplay the selected programme screen.

When the system is running a programme, the screen will display the current temperature within the chamber and the remaining time for sterilization or drying. The current real pressure inside the chamber is always displayed on the screen.

## **1.7 DESCRIPTION OF DISPLAYED MESSAGES AND SAFETY MEASURES**

**LOAD NO.** Message is displayed, when the START key is pressed; performs a count of executed cycles..

**LOW TEMP.** Message is displayed, fail indicator lights and cycle is aborted, if the temperature drops below the required sterilization temperature.

**LOW HEAT** Message is displayed and sterilization does not start if the autoclave has not reached sterilization temperature after heating for 80 minutes (liquid program), and 50 minutes for all other programs.

**HIGH TEMP** Message is displayed, fail indicator lights and programme is aborted:

- If the temperature rises to 3°C (6°F) above the required sterilization temperature during the sterilization cycle or,
- If the temperature sensor is damaged, this message will appear during the HEAT stage.

**LOW PRES** Message is displayed, fail indicator lights, and the programme is aborted if the pressure drops to 4PSI (0.27Bar) below the pressure correlated to the required sterilization pressure.

**HIGH PRES** Message is displayed, fail indicator lights up, and the programme is aborted if pressure rises to 10PSI (0.6Bar) above the pressure correlated to the required sterilization temperature.

**MAN STOP** Message will be displayed and the FAIL indicator will light after the STOP key is pressed for longer than 1 second.

**POWER DN** If a power failure occurred during the STERILIZATION stage, when it resumes, the system automatically readjusts, this message will be displayed for several seconds, the printer prints POWER DN.  
If temperature drops below sterilization temperature, when power returns, the system returns to the heat stage and the POWER DN message is displayed and printed.  
If a power failure occurred during the LIQUIDS PROGRAM, the system will not allow fast exhaust (as exhaust valve is normally closed) during a power failure nor when power is back on.  
If a power failure occurred during the HEAT stage, heating will resume ( provided there is enough water in the chamber. If not, the cycle will abort. Dry and exhaust stages will automatically resume operation once the power is back on.

**ADD WATER** Message is displayed and the respective red LED indicates insufficient water in the water reservoir. After water is added to the reservoir, the START button must be depressed again in order to start the the required sterilization cycle.(This message will be displayed in case of insufficient water in the water reservoir)

**DOOR UNLOCK** Message will be displayed and the DOOR CLOSED LED indicator will remain unlit if the door is improperly closed when the START button should be depressed to start the desired cycle. If the door accidentally opens during any stage of the cycle, the same message and indicator will appear and the system will react as if the STOP key was depressed.

**LOW WATER** If a power failure occurred during the HEAT or STERILIZATION stage, the cycle will resume when power returns, provided there is enough water in the chamber.  
If not, the cycle will abort, the message LOW WATER displayed, and the red FAIL indicator lights up.

**WATER INLET** During the automatic water fill, the message WATER INLET will be displayed, as information to the operator.

## **2. PRINTER (OPTIONAL)**

For process documentation, the autoclave is equipped with an optional character printer, printing for the record a detailed history of each performed cycle.

Print out is on thermal paper with 24 characters per line and contains the following information:

- Real time
- Selected programme
- Selected sterilization temperature
- Selected dry time
- Summary of performed cycle and identification number of the autoclave. To set the autoclave's I.D., please refer to the Dip switches description and functions.
- Programme data

When the autoclave is put into operation by depressing the START key, the printer starts printing the above data.

After the preliminary printing, the autoclave starts performing the sequence of operations of the cycle. The measured values of the HEAT stage, up to the sterilization temperature, are printed every 4 minutes. The sterilization cycle data is printed every 1 minute.

Each printed line contains the symbol of the phase in progress: H (Heating), S (Sterilization), E (Exhaust), D (Drying), respectively, the relative time in minutes (related to the beginning of the cycle), the temperature and pressure values.

At the end of the process the summary of the performed cycle is printed. OPERATOR (name to be manually filled in by the operator), LOAD number and STER (autoclave number).

If operation was normal, the word O.K. is printed.

If operation was interrupted by the control unit, the diagnosis of the failure is printed before the cycle summary.

The last printed line in the case of an aborted cycle is FAIL.

### **3. STERILIZATION PROGRAMMES**

The autoclave offers 3 sterilization programmes and 1 accessory program, at temperatures of up to 134°C with or without drying stage required.

**A.** Three sterilization programs:

1. Unwrapped instruments
2. Wrapped instruments and porous loads.
3. Liquids

**B.** Accessory program:

4. Dry only

The nominal data of the program (default settings) can be changed by means of the temperature, time by the UP/ DN keys, as described in the next paragraph.

#### ***PROGRAM 1. UNWRAPPED INSTRUMENTS***

For unwrapped instruments and materials, when the manufacturer recommends autoclaving at temperatures of up to 273°F(134°C) no preset drying cycle required.

##### ***Nominal parameters default settings***

- Sterilization temperature :273°F (134°C)
- Sterilization time: 3 minutes.

##### ***Operations Sequence :***

- Heating by actuation of electrical heaters until the sterilization temperature is reached.
- Sterilization temperature is maintained constant for the preset sterilization time.
- Fast exhaust, steam is exhausted out of the chamber at a fast rate until pressure drops to zero.

#### ***PROGRAM 2 . WRAPPED PACKS***

For wrapped instruments and materials, when the manufacturer recommends autoclaving at temperatures of up to 273°F(134°C) with a required drying cycle.

##### ***Nominal parameters default settings***

- Sterilization temperature:273°F (134°C)
- Sterilization time :7 minutes
- Dry time:30minutes.

##### ***Operations sequence :***

- Heating, sterilization and fast exhaust as in program 1.
- Dry heating of chamber 30minutes, at a reduced power.

**Note:** At the end of the dry time, the heaters are shut and the compressor continues working for 20 mins., then stops automatically.

This procedure is aimed at slightly cooling the chamber, which is very hot at the end of the drying operation.

In order to stop the compressor before the completion of this time, two alternatives are possible as follows:

- a. Open the door of the autoclave.
- b. Turn off the main power switch.

#### ***PROGRAM 3: LIQUIDS***

For distilled water, solutions, medicines and other liquid preparations in closed bottles or flasks.

##### ***Nominal parameters default settings***

- Sterilization temperature :250°F (121°C).
- Sterilizatin time : upto 30 minutes.

##### ***Operations sequence:***

- Heating and sterilization as in Program 1, but with temperature and time specific to this program.
- Slow exhaust, heating is stopped and steam is let out of the chamber at a slow rate until zero pressure is reached.

#### ***PROGRAM 4: ACCESSORY (DRY ONLY)***

This accessory program allows the user to add dry time after the sterilization time is over.

#### ***STAND- BY HEATING MODE***

The autoclave provides an option of heating the chamber in stand - by mode between cycles with a very low power in order to reduce total cycle time. (1.6% of the total power only). The autoclave will turn off automatically if the interval between sterlization cycles is more than 2 hours.

The stand-by mode is an integral feature on all EKA models.

The company trained technician can cancel this feature on EKA models.

## 4. INSTALLATION INSTRUCTIONS

### 4.1 INSTALLATION, PLACING AND LEVELING

#### *Installation, Placing and Leveling*

##### *Network*



Network and connection should comply to the devices consumption. It must comply to local installation and safety rules and regulations. The voltage supplied to the device must comply with the label  $\pm 5\%$ .

##### *Caution:*



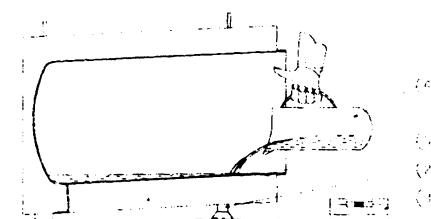
*The sterilizer must be placed on a rigid and leveled surface. The stand must be able to hold the load of the device and loaded material.*

Connect the power cord to the socket on the rear side of the autoclave; plug it into the supply socket.

The amount of distilled water in the autoclave chamber necessary for each sterilization cycle is as follows:

1730	2340	2540	3850	3870
10 OZS.	12 OZS.	12 OZS.	21 OZS.	24 OZS.
300 ML	350 ML	350 ML	600 ML	700 ML

The legs (2) of the autoclave are factory set for the autoclave to hold this amount of water when the autoclave stands on a level surface (3). To check the water level fill a beaker (4) with water with reference to the above table, pour the water into the chamber. The water must reach the indicator groove (5) in front of the chamber and the tip of the electrode located at the rear of the chamber.



If it is necessary, raise the front legs in order to get the proper amount of water.

*IT IS IMPERATIVE TO HAVE THE CORRECT AMOUNT OF WATER FOR THE PROPER OPERATION OF THE AUTOCLAVE.*

*NOTE : Keep the back and the right side of the autoclave approximately 1" (25 mm) away from the wall to allow for ventilation.*

#### **4.1 AUTOMATIC WATER FILLING**

The proper amount of water for automatic filling is preset. However, if in routine operation, there is inadequate water in the chamber, the operator can adjust the level with the automatic built-in system by doing the following.

1. Ensure that the autoclave main switch is in the OFF position.
2. Empty the water from the chamber and leave the door open.
3. Switch on the main power switch while keeping the key depressed until the water reaches the indication groove at the front of the chamber.
4. Release the WATER INLET key. At this point, the automatic control system will memorize the amount introduced into the chamber. This parameter will be stored in memory, to be changed only if the same procedure follows again.
6. Remove the water from the chamber. To check if the system is O.K. leave the door open, press the door switch and press the START key. Now the water flows into the chamber and should stop at the preset place.
7. Remove the water from the chamber.

***WARNING: In case of necessary RESET, repeat all steps listed above. This ensures the correct amount of water enters the chamber for operation.***

***VERY IMPORTANT (FOR THE FIRST OPERATION OF THE AUTOCLAVE):***  
***Due to the fact that air may be trapped in the water pipes, it is recommended that for the first operation the operator does the following:***  
***Open the door, press the WATER INLET key, when water enters the chamber release the key and remove the water from the chamber.***

#### 4.2 FILLING THE WATER RESERVOIR

1. Remove the water reservoir cover. Pour distilled water into the reservoir through the opening on top of the autoclave until it reaches the base of the safety valve holder.

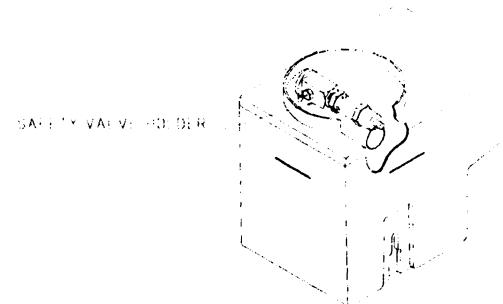
It is recommended to use water having the following characteristics:

1. Electrical conductivity lower than 15 microsiemens.
2. Chlorides content, less than 4 pp.m.
3. PH 6.5-8.

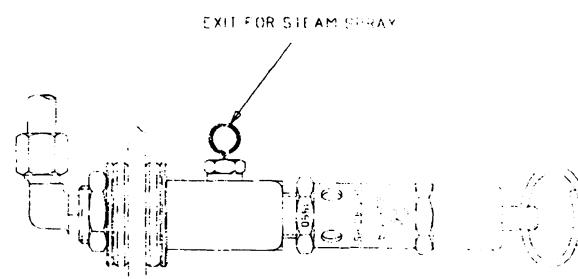
*Caution:*



*Under no circumstance should water be filled above the safety valve holder.*



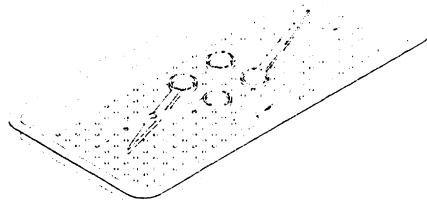
Use distilled water only . Tap water may block the hole of the air trap. This causes air pockets which prevent the temperature from rising. It is essential that from time to time during the sterilization period , **a spray of steam should escape, causing a hissing sound**. If no steam is evident, follow instructions for air trap jet cleaning procedure on page 30.



#### **4.3 PREPARATION BEFORE STERILIZATION**

Instruments to be sterilized must be clean, free from any residual matter, such as debris, blood, pads or any other material. Such substances may cause damage to the contents being sterilized and to the sterilizer.

1. Immediately after use, clean instruments thoroughly to dispose of any residue.
2. It is recommended to wash instruments with an ultrasonic cleaner, using detergent and mineral-free water.
3. After cleaning, rinse instruments for 30 seconds. (follow manufacturer's instructions on the use of products for cleaning and lubricating instruments after using the ultrasonic cleaner).
4. Before placing an instrument into the sterilizer tray, make sure that instruments which are not of the same metal, (stainless steel, carbon steel, etc, ) are separated and placed on different trays.

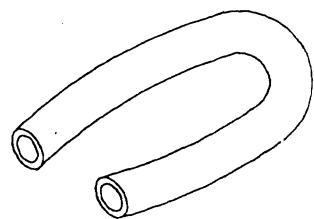
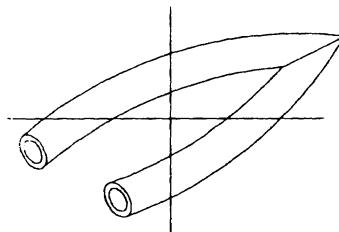


***NOTE: Check manufacturer's instructions for the sterilization of each item.***

5. Incase carbon steel instruments are used with stainless steel trays, the tray should be lined with a towel or paper wrap before placing the instruments on it . There should be no direct contact between the carbon steel and the stainless steel trays.
6. All instruments must be sterilized in an open position.
7. Place a sterilization indicator strip in each tray.
8. Once a week, use a biological spore test indicator in any load to ensure sterilization .
9. Make sure that all instruments remain apart during the sterilization cycle.
10. Empty canisters should be placed upside - down, in order to prevent accumulation of water.
11. Do not overload sterilizer trays. Overloading will cause inadequate sterilization and drying.
12. Allow a distance of approximately 1" between trays to permit steam circulation.

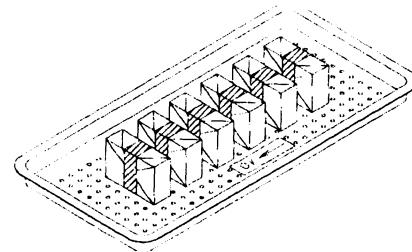
**TUBING :**

Rinse tubing after cleaning with pyrogen free water. When placing in a tray, ensure that both ends are open, without sharp bends or twists.



**PACKS :**

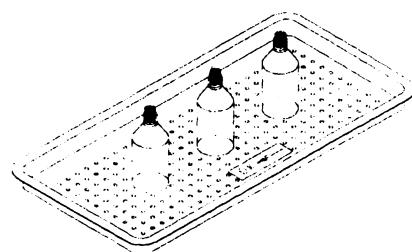
Place packs upright on trays, side by side.  
Packs should not touch the chamber walls.



**STERILIZATION OF LIQUIDS**

Use only heat-proof glass, upto 2/3 full.

Ensure that the glass container is covered but not sealed, to prevent pressure build-up.



## **5. OPERATING INSTRUCTIONS**

1. Insert the plug into the socket.
2. Remove water reservoir cover. Pour distilled water into the reservoir, through the opening on top of the autoclave, until it reaches the base of the safety valve holder, approximately 0.7 gallons (3 liters).
3. Turn on the rocker switch mounted on the bottom of the front panel to power the control circuits.
4. Set the clock for the proper date and time.
5. Press the key to select the required program .The light indicator of the given program is illuminated, indicating the program has been selected. The present data of the program, sterilization temperature, time and dry time are displayed.
6. Load the material to be sterilized into the chamber, close the door making sure the Close Door indicator is illuminated.
7. Press the START key to put the autoclave in operation.  
WATER INLET is displayed until the correct volume of water is automatically introduced. The autoclave starts performing the sequence of operations. The actual measured values of pressure and temperature are displayed continuously and printed every minute (with optional printer).  
The indicator lights HEAT, STE, and DRY are lit as explained before.

*NOTE : It is possible to change parameters 1-7 Page12, only when the autoclave is not in operation. In order to change the fixed preset parameters, proceed as follows:  
To increase or decrease the sterilization temperature, sterilization time or dry time, follow instructions from the chapter 1.4 .*

*Pressing the UP/ DN key, advances the setting upwards or downwards by one unit.  
The displays are updated with every change in the preset data.*

8. During program 2, the dry stage begins after the steam exhaust stage, The exhaust valve is open, while the chamber is heated, which allows evacuation of water vapors and humidity from the chamber.  
For models EA or EKA, an air compressor which works during the dry stage pushes hot air which flows through a  $0.2 \mu$  filter enters the chamber and escapes through the opposite end exhaling the water vapors and improving drying of the sterilized material.

At the end of the cycle a buzzer will ring for approximately 5 seconds, the START light then switches OFF. The exhaust valve is opened to prevent formation of a vacuum, if the door is not opened immediately. In the event of program failure, an exhaust valve is opened and a continuously buzz will sound for 5 seconds followed by an interrupted buzz for 7 seconds.

9. Open the door and unload the sterilized material from chamber.
10. The sterility of instruments processed in unwrapped cycles cannot be maintained when exposed to non-sterile environment.

#### ***HOW TO RESET THE CYCLE COUNTER***

To reset the cycle counter proceed as follows:

1. Press the STOP key a few times, till the CODE 102 appears on the display.
2. Press the UP key (8) up to CODE 134
3. Press any key to continue.  
The counter is now reset.

## **PRINTER HANDLING (OPTIONAL)**

The printer is driven and controlled automatically by the control unit, while the autoclave performs a cycle.

Inserting the paper roll is done according to the following procedure.



Figure 1



Figure 2

1. The paper roll is set inside the unit. Gently push the clips for removing the front panel, remove the panel and pull out the printer gently.
2. The outside and inside surfaces of the paper are different. The printing surface is the outside. Set the paper roll on the shaft. (See Figure 1).
3. Gently push the paper face down into insertion opening (A) in Figure 2. Keep pressing the feed switch (B) until the paper comes out from the print head (C).
4. When the paper from the print head has come out from the paper cutter, replace the front panel on the unit.

***NOTE: If the paper is not pulled in by the rollers even when you press the feed switch (B) push the paper in. The following precautions have to be taken to ensure the proper operation of the printer:***

- Every time a new paper roll is inserted turn on the main power switch while pressing the FEED button. During the insertion of the paper, the printer performs a test, printing all the built-in characters. This ensures a reliable operation of the feed operation of the feed system of the printer.
- Avoid contact between the paper and the hot parts of the autoclave, as the paper will be blackened.
- Do not pull out the paper roll from the paper insertion opening.
- Use only the 58mm. wide thermal paper rolls, supplied by your dealer.

***THE ITEMS LISTED BELOW ARE AVAILABLE BY INDIVIDUAL ORDER ONLY.***

***PACKAGING***

- Sterilization tape
- Sterilization bags
- Sterilization pouches
- Sterilization wrap

***MONITORING***

- Chemical indicator strips
- Chemical indicator cards
- Biological indicator (MAIL -IN SYSTEM )
- Biological indicator (IN OFFICE SYSTEM )

***INSTRUMENTS***

- Biological test incubator.
- Biological test tube.

***CLEANING***

- Autoclave Chamber Cleaner (Chamber Brite)

## **6. MAINTENANCE INSTRUCTIONS**

### **PREVENTIVE AND SCHEDULED MAINTENANCE**

The maintenance operations described in this chapter have to be fulfilled periodically, to keep the instrument in good condition and to reduce the breakdown time to a minimum. These operations can easily be executed by the users maintenance personnel, according to further instructions.

#### **Daily**

Clean door gasket with a soft cloth.

#### **Weekly**

1. Take out the tray holder and trays.
2. Clean the chamber, tray holder and trays with detergent and water with a cloth sponge.  
*Do not use steel wool or steel brush as this can damage the chamber!*
3. Once a week clean and descale the chamber, copper tubes and the reservoir.
4. Put a few drops of oil on the 2 door pins and door tightening bolts.
5. Clean the outer parts of the autoclave with a soft cloth.
6. Once a week drain the water from the reservoir, and pour fresh mineral-free water or distilled water - Refer to recommendations on page 30.

#### **Periodically**

Once every month operate the safety valve.

Replace the air filter of the EKA autoclaves, every six months as follows :

1. Remove the plug from the socket.
2. Remove the filter cover by turning the cover counter-clockwise until the handle is at a vertical position.
3. Pull out the cover.
4. Pull out the filter through the opening and replace it with a new one.
5. Replace the cover (in the vertical position) and lock it into position by turning it a  $\frac{1}{4}$  turn.

#### **Recommendation**

For cleaning and descaling, Tuttnauer offers a powdered cleaner, 'Chamber Brite' which is user friendly and has excellent results.



#### **Periodical Tests**

1. Once a month test the safety valve - refer to page 40.
2. Once a month test the air jet - refer to page 31.
3. Once a year - the electrical connections should be tightened and tested by an authorized electrician.

## **6.1 HOW TO CLEAN THE AUTOCLAVE CHAMBER USING 'CHAMBER BRITE'**

**Chamber Brite** is a powdered Autoclave cleanser which includes 5 simple steps to keep the autoclaves clean and free of water deposit build-up.

Designed especially for steam sterilizers, **Chamber Brite** effectively cleans and descales the reservoir, chamber and copper tubing in minutes.

### *Cleaning Instructions:*

1. Sprinkle **Chamber Brite** powder along the bottom of the autoclave chamber.
2. Run a sterilization cycle (with trays).
3. Drain the solution from the reservoir and discard.
4. Wipe the inside of the chamber with a damp rag or sponge.
5. Fill the water reservoir with distilled water, and the sterilizer is ready for use.

For best results, clean the autoclave every 20 cycles or once per week as needed.

### *Caution*



*Keep out of reach of children!*

*Contains mildly acidic ingredients. Avoid contact with skin eyes or clothing.*

## 6.2 DRAINING THE RESERVOIR

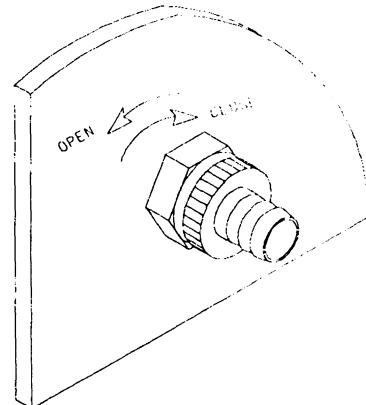
*Caution:*



*Before starting, make sure that the electric cord is disconnected and there is no pressure in the autoclave.*

1. Turn drain valve counter clockwise (1 turn). Use the supplied silicone hose.
2. Turn drain valve clockwise to the close position.
3. Fill reservoir with distilled water until it reaches the base of the safety device holder.
4. Connect the electric cord to power source.

The autoclave is now ready for use.



## 6.3 WATER QUALITY

The quality of mineral - free water is very important in maintaining the autoclave in good condition.

Recommended values follow:

*Evaporation residue*

≤ 10 mg/l

*Silicium oxide SiO<sub>2</sub>*

≤ 1 mg/l

*Iron*

≤ 0.2 mg/l

*Cadmium*

≤ 0.005 mg/l

*Lead*

≤ 0.05 mg/l

*Rest of heavy metals except iron, cadmium,*

≤ 0.1mg/l

*lead*

*Chloride*

≤ 2 mg/l

*Phosphate (P<sub>2</sub>O<sub>5</sub>)*

≤ 0.5 mg/l

*Conductivity (at 20°C)*

≤ 15 µs/cm

*pH value (degree of activity)*

5 to 7

*Appearance*

colourless clean without sediment

*Hardness (Ions of alkalin earth)*

< 0.02 mmol/L

#### **6.4 AIR TRAP JET CLEANING PROCEDURE**

(Located in the water reservoir.)

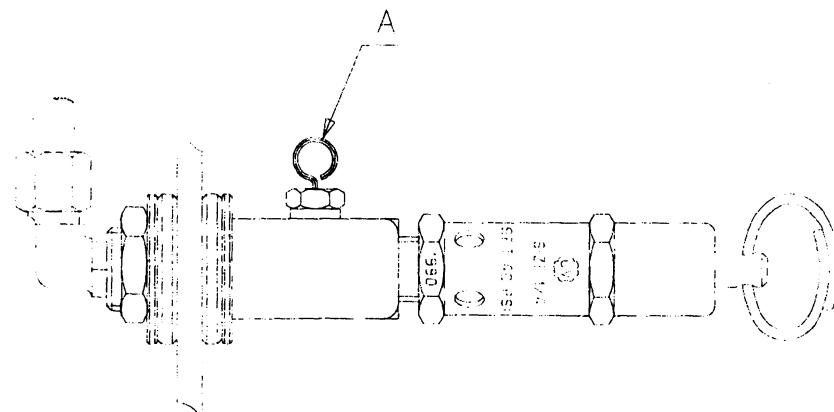
*Caution:*



*Before proceeding, make sure that the electric cord is disconnected and that there is no pressure in the autoclave.*

*Allow the instrument to cool and the pressure to drop to 0, before cleaning the jet.*

1. Remove the water reservoir cover.
2. Clean the hole of the jet, by manipulating the air trap wire back and forth.
3. In case it is necessary to replace the air trap jet, use teflon tape.



## *SERVICE INSTRUCTIONS TECHNICIAN LEVEL*

**WARNING**



*To avoid electric shock, do not perform any servicing other than that contained in the operation instructions and operator service section unless you are qualified to do so. Refer all servicing to qualified technical personnel.*

## **7.1 TROUBLE SHOOTING**

### **RULES OF THUMB FOR SERVICE AT THE CUSTOMER LOCATION:**

- a) At the customer's location, avoid replacing any component which is not connected to a socket or to a flat cable. If the necessary occurs, replace the complete board or box then try and service the damaged part at the service lab.
- b) Whenever the AJUNC3 board of the complete electrical assembly (CB90030) is replaced without replacing the pressure transducer, or after replacing the pressure transducer, the pressure must be re-calibrated.
- c) When working on the autoclave, always DISCONNECT the power cord from the socket or turn the circuit breaker OFF.

### **I TURNING ON THE SYSTEM, NO RESPONSE**

- a) Check the voltage at the terminal (is the power cord interrupted? and change the power cord if necessary)
- b) Check the flat cable connecting the PREG and the AJUNC3 and replace it if necessary
- c) Check if the circuit breaker is OFF and turn it ON
- d) Check the cut off position. Push it IN and turn it ON.
- e) Check the power supply input fuse and replace the fuse if necessary.  
If the network input is OK, the problem must be with one of the elements along the line, the power supply, the PREDG or AJUNC boards and the elements they are connected to.
- f) Check the voltages by means of connecting the Test board to JP14 on the AJUNC 3 board as detailed in the voltage checking procedure, page 49.

### **IF THERE IS NO 12 V NOR 5V :**

- a) Does the power supply receive the network voltage ?
- b) Is the power supply output OK ? Disconnect the connector to JP3 (AJUNC3 board ) and check for voltage on the female connector. No. 12V at the female connector indicates a faulty power supply that should be replaced. At the client's location replace the whole electrical box (C B 90030). 12V at that location indicates that the power supply is functioning and that the problem is somewhere else.
- c) Check the AJUNC3 board. Disconnect the fan (JP5), the valves (JP2) and the printer (if present ). If disconnecting any of these elements brings up the voltage, that element is damaged and has to be replaced.
- d) Disconnect the PREDG board and the printer from the AJUNC 3 board. If any of these elements are faulty, 5v will appear as it is disconnected. If there is still no 5V, the power supply is damaged.

## **2 SYSTEM IS ON - DISPLAY IS NOT LIT**

- If the other LEDS are functioning the display is most likely damaged. Replace the PREDG board.

## **3 SYSTEM ON, DISPLAY LIT, DIGITS ARE NOT VISIBLE**

- Check for 5 V between TP1and TP17
- If yes, calibrate POT 1 on PREDG board.
- If digits are still not visible, this may be due to a faulty display or a faulty micro controller. Try to replace them or replace them or replace the complete PREDG board .

## **4 SYSTEM ON, DISPLAY LIT, ERRONEOUS OR FRAGMENTED DIGITS**

The reasons for that may be faulty Real Time Clock, displays or microcontroller. Replace them or replace the complete PREDG board.

## **5 SYSTEM ON, KEY RESPONDS WITHOUT BEEPING**

The problem may be with the buzzer or the buzzer's driver:

Replace the complete PREDG board, replace the buzzer or replace transistor 2N2222A, Q1.

## **6 EXHAUST VALVE IS ALWAYS ON**

The problem could be with the solenoid, the transistors, or the digital control, or a bad connection..

- Check and properly connect or replace all connections to and from the exhaust valve.
- The problem could be with Q4 or Q5 on the PREDG board. If after pressing START and the water enters the chamber, the voltage on TP11 is between 10V - 12V the control and the transistors are O.K. If not, replace the PREDG board. At this point disconnect connector JP2 from the AJUNC3 board, and check the valve's control.

If the connection to the valve is OK, (please refer to the wiring diagram) there must be a mechanical problem with the valve or the solenoid may be damaged.

If the control is faulty, check and connect the flat cable between AJUNC3 and PREDG, replace the cable if necessary. If this does not help, there may be a problem in the LATCH DRIVE at U4 in PREDG. In that case the electronics unit should be replaced.

## **7 EXHAUST VALVE IS ALWAYS OFF**

- Check and connect or replace the connector between the EXHAUST valve and the AJUNC3.
- Repeat transistors and control checks as in 7.6 but this time the voltage for

the transistors should be vice versa: 0.0-1.0 DC. volt (on TP11) for Open position.

- Check and replace the valve or the coil.

#### ***8 INLET KEY DOES NOT LET WATER INTO THE CHAMBER***

- Check if this key is faulty. If it beeps when pressed it is O.K. if not replace the keypad. If this does not help, replace the complete PREDG and keypad unit.
- Check the float at the water reservoir by manipulating it using a screwdriver or a tool, and repair/ replace it. If the float is functioning, the problem could be with the control circuit at the PREDG board: the Test board between TP1 (GND) and TP10 (water valve): GOOD = 0.0V to 0.05V.
- If the control is OK, there may be a problem with the valve itself or with its connector.
- Check and replace the coil if necessary.

#### ***9 WATER VALVE IS ALWAYS ON AND THERE IS A CONTINUOUS FLOW OF WATER INTO THE CHAMBER***

Check the valve's solenoid and the control circuit as you have checked the respective exhaust valve and circuit (7.6, 7.7.). The valve could also be checked by depressing the MANUAL water inlet key. If water flows in the chamber, or if there is no flow of water once the system is initialized, the valve and its control are fine, but the water level detector electrode may be damaged, or the connection between the electrode and the circuit may be bad.

Check the wire and the connector connecting the electrode to the AJUNC3 board.

#### ***10 PRESSURE STAYS CLOSE TO 100 kPa (0 Psi), TEMPERATURE DOES NOT EXCEED 110- 115°C (207°F) OR, WATER INLET LASTS A LONGER TIME THAN USUAL***

This phenomena is most likely due to malfunction of the air valve. The air valve's normal operation is as follows:

OPEN whilst turning the system on, OPEN throughout WATER INLET and HEAT until temperature has reached 90°C or 194°F, CLOSED from that stage on, and OPEN during DRY.

The valve's control on the AJUNC3 board should act as follows:

0.0V = valve OPEN  
5.0V = valve CLOSED

If the problem lies on the AJUNC 3 board it should be replaced. It is recommended to replace both the AJUNC 3 and the solenoid because a damaged solenoid may affect the AJUNC3 board. If the control circuit on the AJUNC3 is OK, the problem is probably with the PREDG board.

## *11 HEATERS ARE ALWAYS OFF or ON*

**WARNING : IF YOU NEED TO TIGHTEN A SCREW, MAKE SURE TO DO SO ONLY WHEN POWER CORD IS DISCONNECTED.**

- Check the heaters connections.
- Check the cutoff thermostat position and turn it clockwise to the end .
- Check the control at TP1 and TP12 for ON = 0.0V OFF = 5v
- Check connections between AJUNC3 to SSR at TP4.  
Does AC voltage enter the SSR at AC connector (page 75) and SSR pin 2.
- Is SSR output the AC voltage ? Check AC connector (page 75) and at the SSR pin 1.
- Is the control OK? Check the SSR for 5.0v between pins 3&4 . If control is OK, but SSR output is not the AC voltage, - replace the SSR.

## **12 HEATERS OK BUT AUTOCLAVE DOES NOT REACH STERILIZATION TEMPERATURE**

- Check and calibrate the cutoff position.
- Check and clean/ replace leakage at the exhaust valve.
- It is also possible that there is a calibration variance, check the GAIN pressure calibration, perhaps it should be lowered or, the GAIN temperature should be increased.(Please refer to the calibration paragraph...)
- Another possibility is that insufficient water level in the chamber does not allow the pressure to build up. Check the water level detector electrode, or the leveling of the autoclave.

## **13 FAN IS NOT ON DURING THE CYCLE**

- Check and connect properly the FAN'S connector at JP5 on the AJUNC3 board.
- Disconnect FAN and check the control TP1 and TP-13:  
ON = 0.0V                                    OFF = 5.0V

## **14 PRESSURE DISPLAY IS INCORRECT (DISCREPANCY BETWEEN ANALOG AND DIGITAL DISPLAYS)**

- Re-calibrate the displayed pressure by manipulating POT2 on the AJUNC3 board.
- Check the MPX2200A pressure transducer between TP2 & TP3:  
Working condition = 20mV for 100 kPa.
- If pressure transducer is faulty, replace it, and calibrate it according to the calibration instructions on page 48.
- If the pressure transducer is OK but display incorrect, replace the AJUNC3.

**15. TEMPERATURE DISPLAY IS INCORRECT**

- Check the temperature sensor PT100.
- Check the calibration of the temperature circuit.

**16. ADD WATER (*to reservoir*) INDICATOR IS ALWAYS ON**

- Check the connector at JP2 on AJUNC3 board.
- Check if the float at the water reservoir is stuck.
- Check the input: TP1 and TP8 FULL = 0.0V  
EMPTY = 5.0V
- Check the float's buffer, it may be, the input at U5 on PREDG is damaged. If so, the PREDG should be replaced.

**17. DOOR CLOSED INDICATOR IS ALWAYS ON/OFF**

- Check and fine tune the switch at the upper front left side of the autoclave, while the door is open. Check the switch with an Ohm- meter. If the microswitch is damaged, replace it .
- Check the LED, if it is burnt, change the PREDG and keypad.
- Check the connector between microswitch and AJUNC3 on TP2.
- Check the connection on GND to the microswitch with an Ohm-meter and be sure that the GND to the micro switch.
- If the switch and microswitch are OK, buffer at U5on PREDG may be damaged, in that case, replace the PREDG board.

*Note :*      **If replacing the microswitch is necessary, MAKE SURE TO DO SO ONLY WHEN THE ELECTRIC CORD IS DISCONNECTED.**



**18. START KEY DOES NOT LET WATER INTO THE CHAMBER**

- Follow previous procedures for float, controls and valve.
- Check the water level electrode: Connect TP1 and TP6,close the door, press START
- If 4v the electrode is short circuited or faulty. Same procedure may be followed without pressing START, if the door is open.

**19. BACKUP MEMORY DOES NOT FUNCTION, NEW PARAMETERS ARE NOT STORED IN MEMORY**

- The backup battery in the Real Time Clock is damaged so component U2 should be replaced.

## **20. LOW PRESS MESSAGE IS DISPLAYED**

This is usually due to insufficient water inside the chamber.

- If the water valve is OK, the electrode detecting the water level may be damaged. It may detect water in the chamber although it is actually empty.
- The normal operation procedure of the electrode is to let water in the chamber 8 additional seconds after it has detected a sufficient water level.  
If the electrode is short circuited, it may let water into the chamber for **ONLY** seconds.
- Check if there is any contact between the electrode and the chamber. Use an Ohm- meter for that purpose. Make sure none of the tools to be sterilized has any contact with the electrode. If the problem persists, the electrode circuit on the AJUNC3 board may be short circuited or damaged.

## **21. CLOCK AND DATE ARE INACCURATE, NEW DATA IS NOT KEPT IN MEMORY**

- If new data (operator's own parameters ) is not kept in memory, then the backup battery is down, and the same unit has to be replaced as the backup battery is an integral part of the Real Time Clock. Change the Real Time Clock (U2), on PREDG.
- The battery manufacturer offers a ten year guarantee, but it is recommended to change the Real Time Clock including the integrated backup battery once every 8 years.

## **22. UNPREDICTED FUNCTION OF THE AUTOCLAVE**

- Check the input and output voltages. Disconnect the printer as it may be causing a short circuit if it is faulty. If the problem persists, the keypad may be short circuited, replace it with the PREDG board, if that does not help, replace the complete electronic system.

## **23. DISPLAYING OF LOW TEMPERATURE**

If LOW TEMPERATURE is displayed, the following should be checked :

1. The proper amount of water is in the chamber.
2. The safety thermostat cuts off the heating elements during the sterilization stage.  
To raise the working temperature, do one of the following:  
Using a plier or a screwdriver, turn the thermostat stem clockwise 1/8 - 1/4".  
Repeat this procedure if necessary.

## **24. MEMORY RESET**

To reset the memory of the autoclave control unit backed up by a battery, proceed as follows: Be sure that there is no pressure in the autoclave chamber.

Turn the main switch to OFF position.

Press the STOP key. At the same time turn the main switch to ON position.

Keep pressing the STOP key until the program parameters are displayed.

Set the Sterilization temperature, Sterilization time, Date and Time.

Repeat the procedure of automatic water filling - Page 20.

25. *EKA ONLY - Pump and valve always ON or OFF*
  - Check the S.S.R2 in the electric box.
  - Check if TP 18 is in 0.0V if on and 5.0V if off, if yes replace PREDG.  
If not replace the AJUNC3 board.
26. *EKA - Pump is always on, valve is off*
  - The problem is in the pump or in SSR2 located in the electric box.

## **7.2 HOW TO CHANGE THE CARTRIDGE FUSE**

### ***Caution***



*Make sure, the electrical power cord is disconnected!*

Use a screwdriver to unlock the fuseholder cover by turning it counter clockwise a little, and pull it out.

Insert a new cartridge into the holder and turn the cover clockwise until locked.

***Ensure the correct fuse is installed as marked!***

The bottom two protects line and Neutral  
Fuse 15A type T5 x 20  
or Fuse 10A type T5 x 20

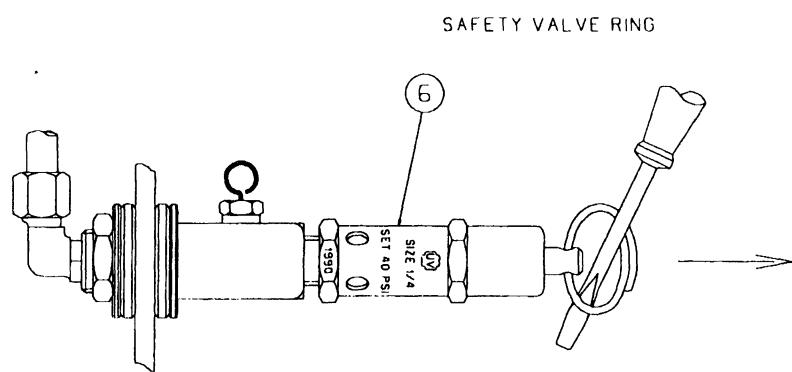
The top one protects the air pump  
Fuse 1.2 A type T 5x20.

### **7.3 HOW TO CHECK THE SAFETY VALVE**

Located in the water reservoir.

In order to prevent the safety valve from a blockage, it is necessary to allow the steam pressure to escape through it ( every two months).

1. Operate the sterilization cycle according to the manual.
2. Allow a pressure of approximately 30 psi to build up in the chamber.
3. Remove water reservoir cover.
4. Pull the ring of the safety valve using a tool, i.e. screwdriver, hook etc and lift the safety valve for 2 seconds. Be careful not to burn your hands.



5. Press the STOP key to interrupt the operation, and exhaust steam from chamber.
6. Wait until the pressure goes down to zero, only then can the door be opened.

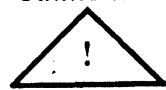
#### **7.4 REPLACING THE SAFETY VALVE**

**CAUTION:** Before starting, be sure that the electric cord is disconnected and that there is no pressure in the autoclave.

1. Remove the water reservoir cover.
2. Unscrew the safety valve and remove from the safety valve base.
3. Replace it with a new safety valve (use the teflon tape attached)
4. Test one autoclave cycle.

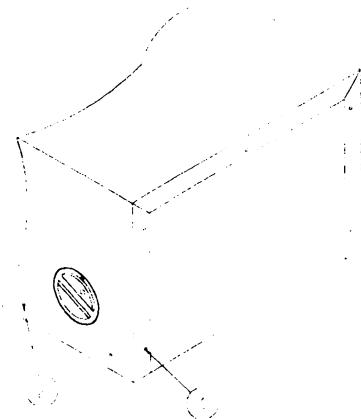
#### **7.5 HOW TO DISMANTLE OUTER COVERS OF AUTOCLAVE**

**Caution:**



*Before starting, disconnect the instrument from the power source and ensure that there is no pressure in the autoclave.  
Allow the autoclave to cool before removing outer covers.*

1. Remove the screws holding the rear cover (1).
2. Remove the screws holding the cover to the base (2).
3. Remove the screws holding the Filter cover.
4. Remove the cover from the earthing wires.
5. Pull the cover upwards.



## **7.6 TEMPERATURE SAFETY THERMOSTAT**

Located on one side of the heater.

The autoclave is supplied with a temperature thermostat which maintains the temperature during the dry stage, by connecting and disconnecting the electric power.

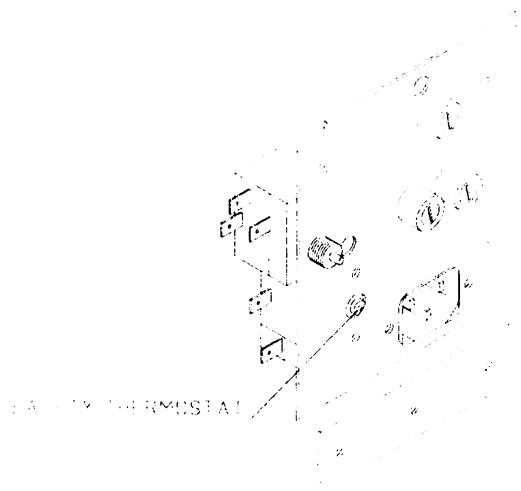
This device automatically reconnects when the chamber cools down.

To replace this safety thermostat, remove the rear cover, unscrew the thermostat and replace it.

*Caution:*



*Before moving the autoclave, make sure that the electric cord is disconnected from the power source and that there is no pressure in the chamber.*



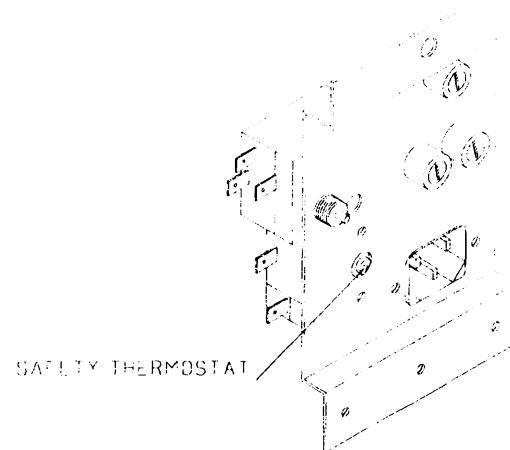
## 7.7 CUT-OUT THERMOSTAT

This thermostat cuts out the power to the autoclave, in the event that all other safety systems do not function. For example: if the operator forgets to fill the chamber with water, and then starts the sterilization cycle, the safety thermostat cuts the electricity to the heaters.

If it does not and the temperature still rises, then the cut-out thermostat will cut-out the power to the autoclave. In order to restart the operation, press the **Reset Button**. If the autoclave is operated according to the instructions, and the thermostat again cuts out, a service technician should be called.

The thermostat can be calibrated with a screw driver by turning the center adjust screw (1):

- clockwise to raise the temperature.
- counter-clockwise to lower the temperature.



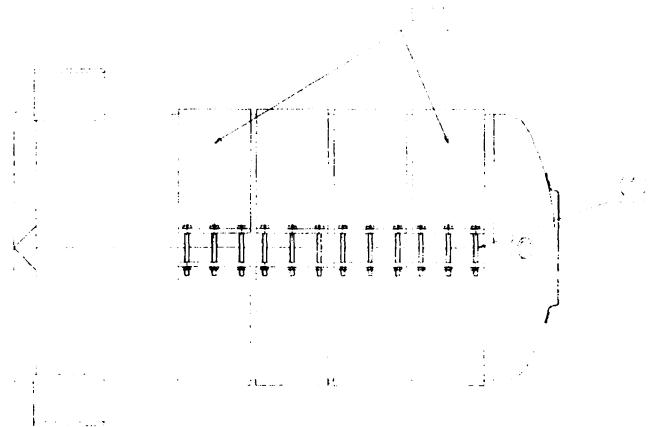
## **7.8 HEATER REPLACING PROCEDURE**

*Caution :*



*Before starting, be sure that the electric cord is disconnected from the power source and that there is no pressure in the autoclave chamber.*

1. Dismantle the autoclave cover.(page 41)
2. Remove the heater tightening bolts (1)
3. Release the two terminal wires from the heating element.
4. Make sure the heater strap is well tightened to the autoclave body, so as to ensure a proper heat dissipation for the heat element.
5. Replace the autoclave cover.
6. Test all the autoclave cycles .



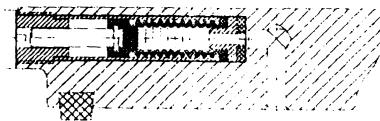
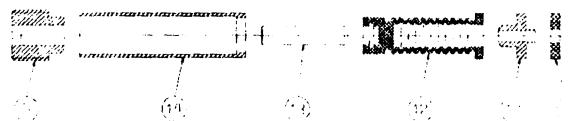
## **7.9 PRESSURE DOOR LOCK SYSTEM**

This safety device prevents the door from opening when the chamber is pressurized. The system is based on the built in pressure in the chamber which pushes the Silicon - rubber bellows (12) and the pin (13) into the groove of the tightening bolt. This prevents the operator from opening the door. When the steam is released, this bellow and pin return to their original position, thus releasing the tightening bolt.

### **DOOR BELLOW REPLACEMENT PROCEDURE**

Located in the door bridge.

1. Open the door.
2. Unscrew and remove the tightening screw (5).
3. Gently pull out the door safety device locking pin(13)
4. It is possible that the washer and bushing (7,10) will be stuck - if so, push them out by introducing pressurized air through the steam inlet hole.
5. Reconnect the door device locking pin (13) into a new silicon bellow (12).

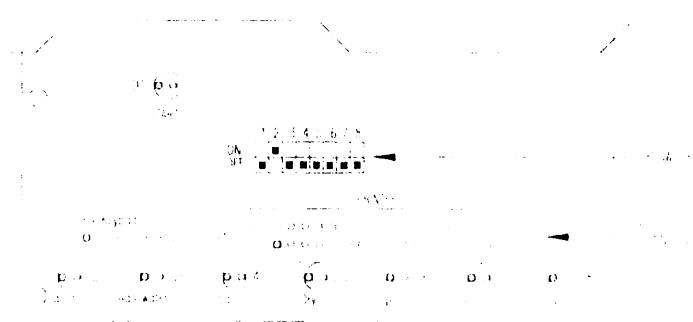


## **8. DESCRIPTION AND FUNCTION OF DIP-SWITCHES**

The system allows certain changes of specific parameters:

1. Connection of an optional printer.
2. Change of parameters (temperature and time).
3. Setting autoclave identification, if there is more than one autoclave in the facility.
4. Stand by shoot mode.
5. Selecting between F°, C°, BAR, PSI.
6. Selection of dry cycle shoot mode for the quick or regular autoclave.

Changing the position of the DIP-SWITCH, as described below determines these parameters.



## **8.1 HOW TO CHANGE THE PARAMETERS**

Not all the switches are relevant to this autoclave, details will be given for the relevant switches only:

**NOTE :Changes must be done when the autoclave is shut off.**

SWITCHES 1,2 - Selecting an identification number for the autoclave

1 ON ,	2 ON	=	number 1
1 ON,	2 OFF	=	number 2
1 OFF,	2 ON	=	number 3
1 OFF,	2 OFF	=	number 4

SWITCH 3 - Change of parameters

ON	=	Unable to change option
OFF	=	Able to change option

SWITCH 4 - Stand by shoot mode

ON	=	Able
Off	=	Unable

SWITCHES 5,6 - Selection of temperature and pressure parameters

5 OFF,	6 OFF	=	F°,PSI
5 OFF,	6 ON	=	F°,BAR
5 ON,	6 OFF	=	C°,PSI
5 ON,	6 ON	=	C°, BAR

SWITCH 7 - Factory use only.

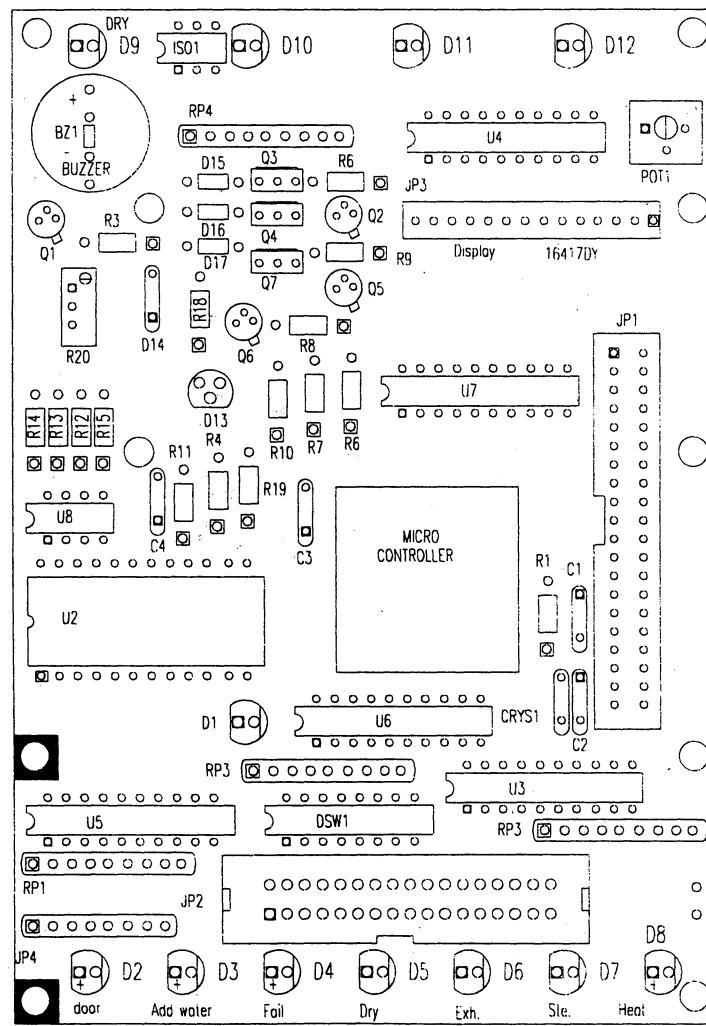
SWITCH 8 - Option for connecting a printer.

ON	-	printer is connecting.
OFF	-	printer not connected.

**9. TEST POINTS - TABLE AUTOCLAVE(AJUNC 3 BOARD)**

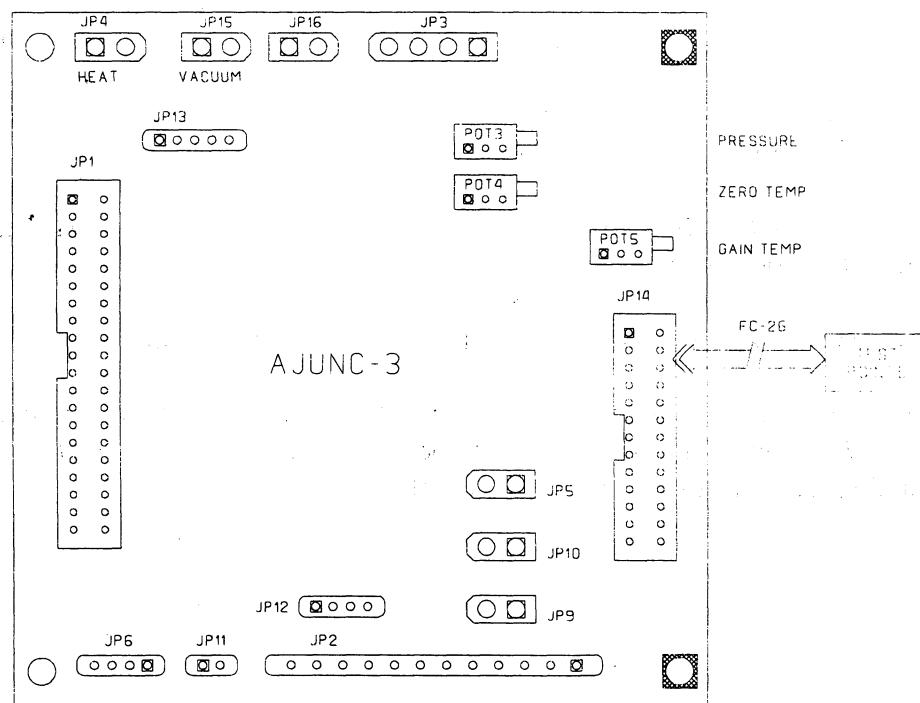
<i>NU TP</i>	<i>FUNCTION</i>	
TP1	GND	
TP4	ANALOG PRESSURE	"0" B - 0.5V
TP5		
TP6	ELECTRODE (WATER LEVEL)	ON-4V; OFF-0V
TP7	OUT PT-100	134°C - 151.4 Ω - 2.385V
TP8	FLOAT SWITCH	OPEN -5V; CLOSE-0V
TP9	DOOR SWITCH	OPEN-5V;CLOSE-0V
TP10	WATER	ON-0V; OFF -12V
TP11	EXHAUST VALVE CONTROL	ON-0V; OFF-12V
TP12	HEATERS CONTROL	ON-0.7V; OFF-5V
TP13	FAN CONTROL	ON-0V; OFF -12V
TP14	AIR VALVE (TOP EXH') CONTROL	ON-0V; OFF-5V
TP15	VEE	12V
TP16	-VCC	- 5.2V
TP17	VCC	+5.2V
TP18	AIR INLET VALVE (Compressed air)	ON -0V; OFF-12V
TP19		
TP21		
TP22	THERMOSTAT	ON-0V; OFF-5V
TP23		
TP24		
TP25	ZERO PT-100 “-”	0°C - 100Ω-“0”mV
TP26	ZERO PT-100 “+”	0°C - 100Ω-“0”mV

## **10. PREDG - BOARD**



## **10.1 AJUNC - 3 BOARD**

**AJUNC-3 - ANALOG AND CONNECTION BOARD**



## **II. CALIBRATION AND TESTING PROCEDURE**

The system is provided with a number of test points for check - up and adjustment purposes. For this purpose, the connector JP14 on the AJUNC3 board has to be connected with the Test board.

The above board is supplied only to service personnel which maintain and service the autoclaves.

A digital multi-meter with a 1 mV resolution is needed for check - up and repair.

### **CHECK- UP OF VOLTAGES**

GND check up - check the voltage between test point TP1 and the body of the autoclave. If the measured voltage is higher than 30mV, we face a problem of unsuitable grounding at one of the electronic boards or some other electronic component (like power supply).

Checking of 12V - connect the negative probe of the multi-meter at TPI and the positive probe at TP 15, the measured voltage should be 12V.

If voltage is not correct, the fuses on the primary and secondary circuits have to be checked to see if they are not blown.

Take the connector off the board, and check for a short-circuit on the board.

Checking of 12V - connect the negative probe of the multi-meter at TP1 and the positive probe at TP17, the measured voltage should be 5V. If voltage is incorrect the fuses on primary and secondary circuits have to be checked.

## **CALIBRATION PROCEDURE**

### ***Calibration MPX 2200***

1. Connect the (negative probe) of the multimeter at TP1 and the (positive probe) at TP4 turn POT2, the measured voltage should be 0.5 V.

### ***Temperature Calibration OF PT-100***

1. Connect to JP11 resistor  $100\Omega$  ( $2^\circ C$ ) and calibrate between TP25 (negative probe) and TP26 (positive probe) with POT4 to 5.1mV.
2. Connect to JP11 resistor  $151.4\Omega$  ( $134^\circ C$ ) and calibrate between TP1(negative probe) and TP7 (positive probe) with POT5, the measured voltage should be 2.385V.

## ***PRINTER***

The data print unit, model DPU20 - 24CF manufactured by SEIKO - Japan is a panel-mount character printer for printing data from computers or other host systems, like the microcomputer control system of the table - top sterilizer. It has a built - in data memory and character generator and can print expanded and inverted characters. The printer unit is composed of a data buffer, character generator, print timing controller by host system software, printer driver and printer mechanism.

The printer system is a thermal paper is 58mm wide, while the effective printing width is 46mm. Corresponding to 24 columns; the printing speed is approximately 0.8 lines/ second.

The principle electrical characteristics of the printer are:

- data input, 8- bit parallel, TTL level,  
Centronics standard - protocol, handshaking with STROBE and READY /  
BUSY lines.
- supply voltage, 5VDC 0.25V 3.0A, maximum - standby 250mA maximum.

The detailed specifications of the printer as well as handling and operation instructions are given in the following excerpts from the Instruction Manual of the unit.

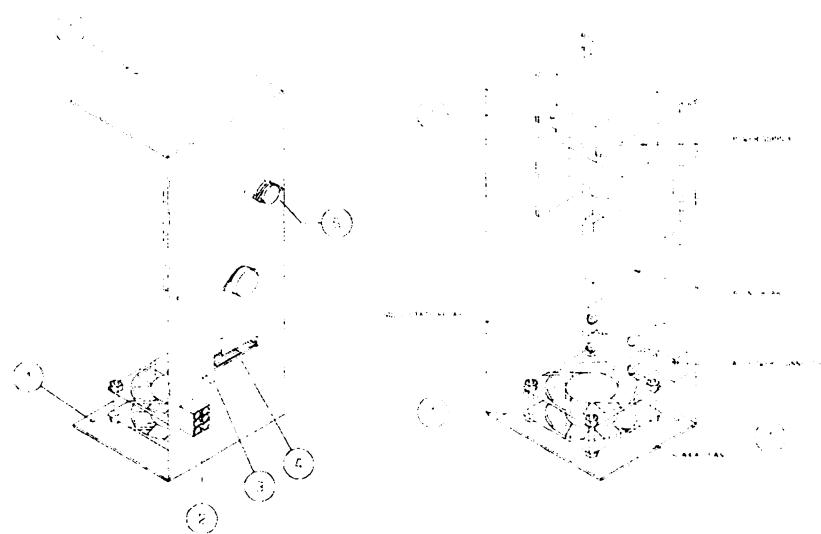
## 12 HOW TO REPLACE ELECTRONICS BOX

*Caution:*

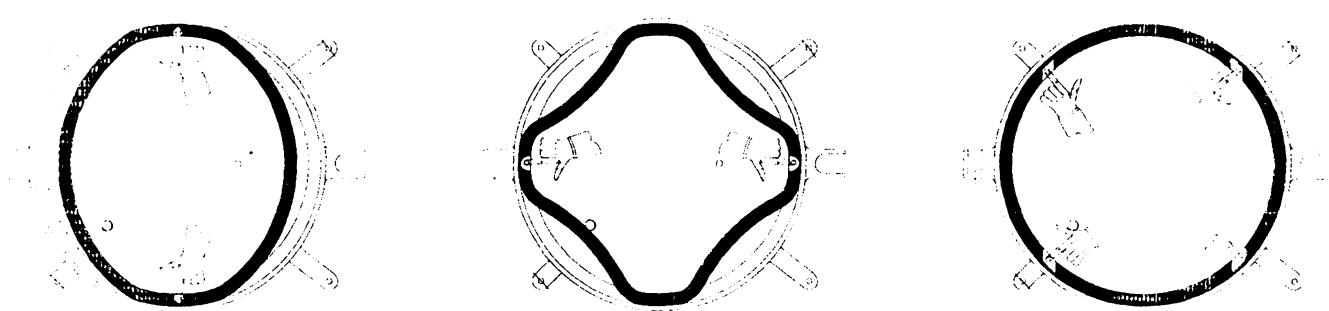


*Ensure you disconnect the power cord !*

- Allow the instrument to cool before removing the outer covers.
- Follow the instructions HOW DISMANTLE THE COVER (page 41).
- After the cover is off, remove the two screws which connected the box to the autoclave base(1).
- Remove the top screw which is connected the box to the upper panel frame.
- Disconnect the connectors no.6,8 and cable shoe no.7.
- Remove the PVC tube (5) from the pressure transducer (4).Pull up the electronic box and replace with a new one.



## **12.1 REPLACING THE DOOR GASKET**



*Pull off the gasket from the door groove, thereby installing the new gasket referring to the drawings above 1 , 2 and 3.*

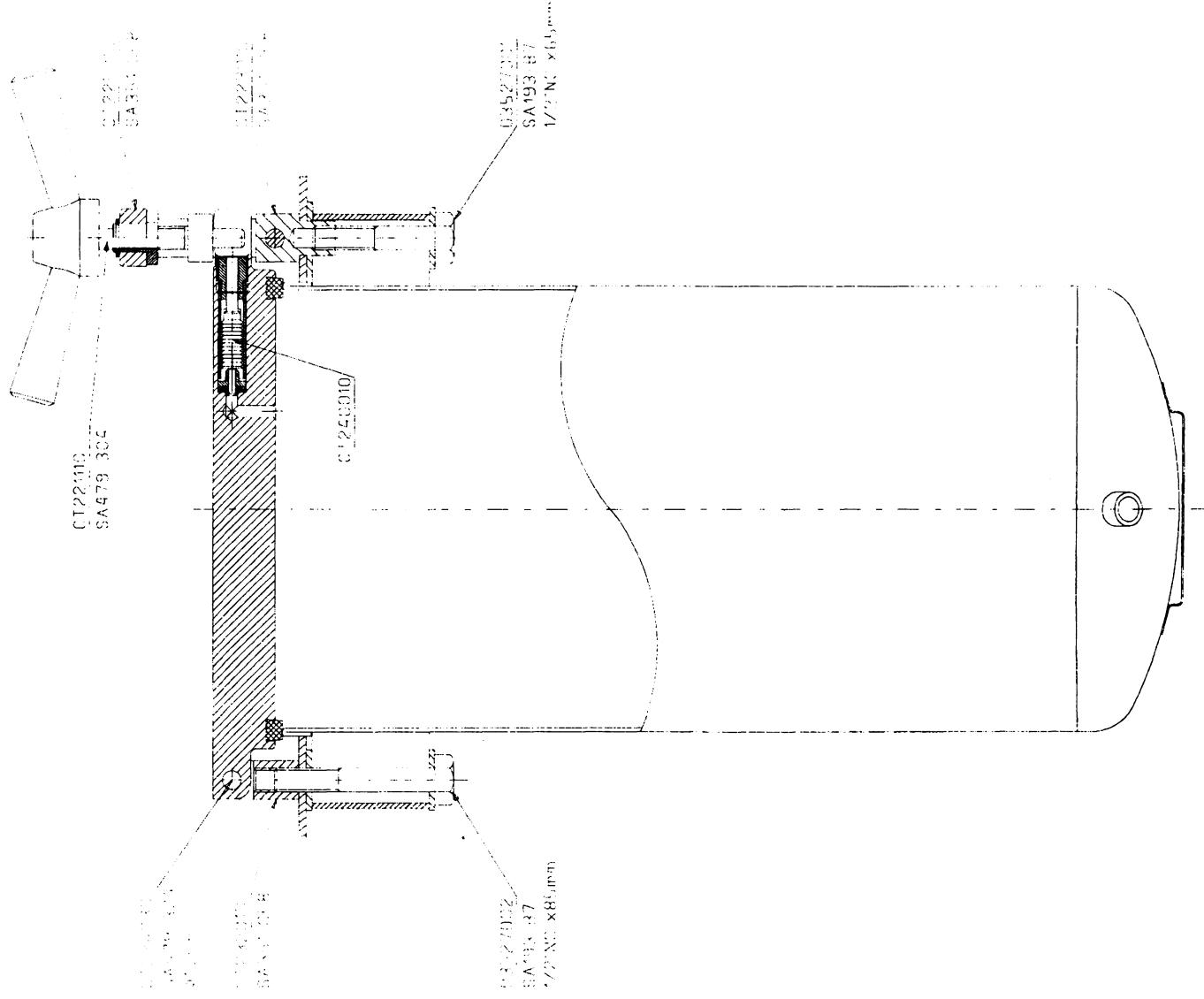
**13. LIST OF SPARE PARTS**

<b>DESCRIPTION</b>	<b>2340 EKA</b>	<b>2540 EKA</b>	<b>3850 EA</b>	<b>3870 EA</b>
Printer	01610100	01610100	01610100	01610100
Printer paper roll	01610406	01610406	01610406	01610406
PT100	01610501	01610501	01610501	01610501
Safety thermostat	01620015	01610501	01610501	01610501
Cut out thermostat	01620004	01620004	01620004	01620004
MPX 2200AP	01630101	01630101	01630101	01630101
Water level switch	01630302	01630302	01630302	01630302
Heater, 110V / 350 W E	01710002	01710003	-	-
Heater, 220 V / 350 W E	01720005	01720006	-	-
Heater, 110V/ 450W EK / EKA	-	-	-	-
Heater, 220V / 450 W EK / EKA	-	-	-	-
Heater, 220V/ 550 W EK / EKA	01720013	01720014	-	-
Heater, 250V/550W EK/EKA	01720020	01720021	-	-
Heater, 230V/600W 3850 E/EA	-	-	01720029	-
Heater 230V / 500W 3870E/EA	-	-	-	01720007
Solenoid valves ¼ x 3	01810101	01810101	01810101	01810101
Solenoid 1/4 x 6	01810102	01810102	01810102	01810102
Fuse mini 1.25A(5x20) type T	01910106	01910106	01910106	01910106
Fuse mini 10A (5x20)type T	01910115	01910115	01910115	01910115
Fuse mini 15A (5x20) type T	01910166	01910166	01910166	01910166
Fuseholder, mini	01910103	01910103	01910103	01910103
Main power switch	01910172	01910100	01910100	01910100
Door switch E13 - 00M	01910190	01910190	01910190	01910190
Air pump for EKA 220V	02200052	02200052	02200052	02200052
Air pump for EKA 110V	02200053	02200053	02200053	02200053
Pressure gauge 1.5"	02300120	02300120	02300120	02300120
Bakelite handle	02400009	02400009	02400009	02400009
Water reservoir cover	02400014	02400014	02400014	02400014
Front panel Polyethylene	02550002	02550002	02550018	02550018

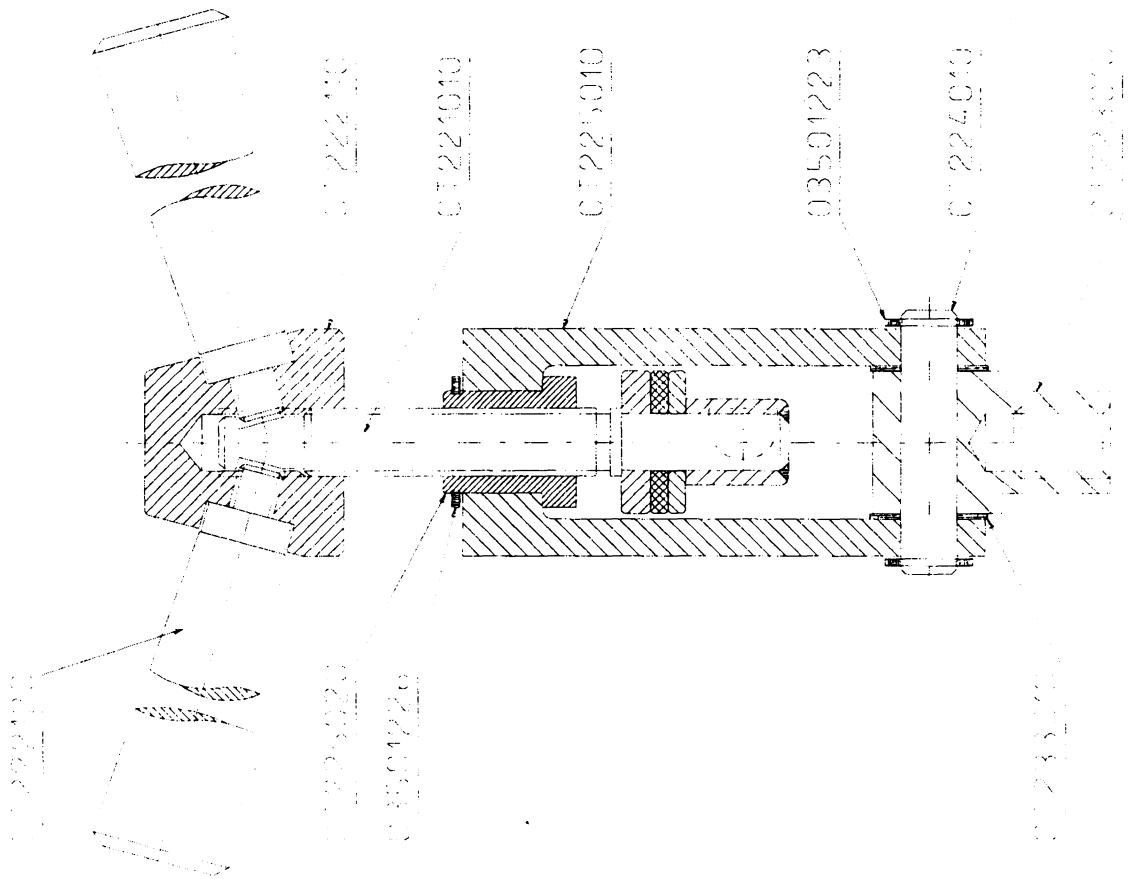
<b>DESCRIPTION</b>	<b>2340 EKA</b>	<b>2540 EKA</b>	<b>3850 EA</b>	<b>3870 EA</b>
Base for front panel Polyethylene	02550000	02550000	02550021	02550021
Door cover +Pressure gauge	02550001	02550001	-	-
Door cover without pressure gauge	-	-	02550016	02550016
Printer opening cover	02550005	02550005	02550005	02550005
PVC cover, SSR/25A	02500008	02500008	02500008	02500008
Silicon bellows	02610018	02610018	02610018	02610018
Door gasket	02610118	02610023	02610019	02610019
Silicon washer (bellows)	02610025	02610025	02610025	02610025
Water reservoir gasket	02610029	02610029	02610029	02610029
Silicon drain tube	02620016	02620016	02620016	02620016
Socket for electric cord 15A/USA	02819992	02819992	02819992	02819992
Socket for electric cord 10A/EUR	02819993	02819993	-	-
Socket for electric cord 16A/EUR	-	-	02819991	02819991
Cord + plug + socket EUR 220v	02819994	02819994	02819990	02819990
Cord +plug +socket USA 110V	02819995	02819995	-	-
Cord + plug +socket USA 220V	02819996	02819996	02819996	02819996
Flat cable for digital printer	02830102	02830102	02830102	02830102
Flat cable - Predg - Ajunc3	03700027	03700027	03700027	03700027
Safety valve	03110002	03110002	03110000	03110000
Air filter for EKA	03140036	03140036	03140037	03140037
Drainage valve complete	03131101	03131101	03131101	03131101
Sheet bolt 4.8 x 12	03500201	03500201	03500201	03500201
Sheet bolt 4.8x1.2	03501135	03500135	03500135	03500135
Sheet bolt 4.8x 2	03501136	03501136	03501136	03501136
Bolts 1/2 UNC x 90	03527001	03527001	03527001	03527001
Bolts 1/2 UNC x 115	-	-	03527003	03527003
Bolts 1/2 UNC 90	03527002	03527002	-	-
Bolts 1/2 UNC 155	-	-	03527004	03527004

<b>DESCRIPTION</b>	<b>2340 EKA</b>	<b>2540 EKA</b>	<b>3850 EA</b>	<b>3870 EA</b>
Ajunc 3 board	03700027	03700027	03700027	03700027
Predg board	03700026	03700026	03700026	03700026
Keypad panel	03700027	03700027	03700027	03700027
Short leg	04010001	04010001	04010001	04010001
Rear rubber leg	04010004	04010004	04010004	04010004
Power supply HC PU40-23S	04400229	04400229	04400229	04400229
Blower 12 VDC	04203801	04203801	04203801	04203801
SSR for heating element 25A	04400338	04400338	04400338	04400338
Electric box assembly (complete) for E models 220 V	0512340 E 220	0512340 E 220	0513870 E 220	0513870 E 220
Electric box assembly (complete) for EA models 220V	0512340 EA 220	0512340 EA 220	0513870 EA 220	0513870 EA 220
Electric box assembly (complete) for E models 110 V	0512340 E 110	0512340 E 110	-	-
Electric box assembly (complete) for EA models 110V	0512340 EA 110	0512340 EA 110	-	-
Outer cover	CB330010	CB330010	CL330010	CD330010
Back cover	CB340010	CB340010	CD340010	CD340010
Outer cover for EA	CB330020	CB330020	CL330020	CD330020
Autoclave vessel	CB100010	CA100010	CL100010	CD100010
Door assembly	CB240010	CA240010	CC240010	CC240010
Complete closing device	CT220010	CT220010	CC220010	CC220010
Air relief valve for K	CB842010	CB842010	CB842010	CB842010
Air relief valve for M, E	CT842010	CT842010	-	-
Water reservoir	04300005	04300005	-	-
Complete set of door bellows without housing	CT241111	CT241111	CT241111	CT241111
Upper tray support	CT530010	CT530010	-	-
Tray holder	CT510010	CV510010	CF510010	CC510010
Tray (big)	CT520010	CT520010	CF520010	CC520010
Tray handle	CT530020	CT530020	-	-
Tray (small )	-	-	CF520020	CC520020

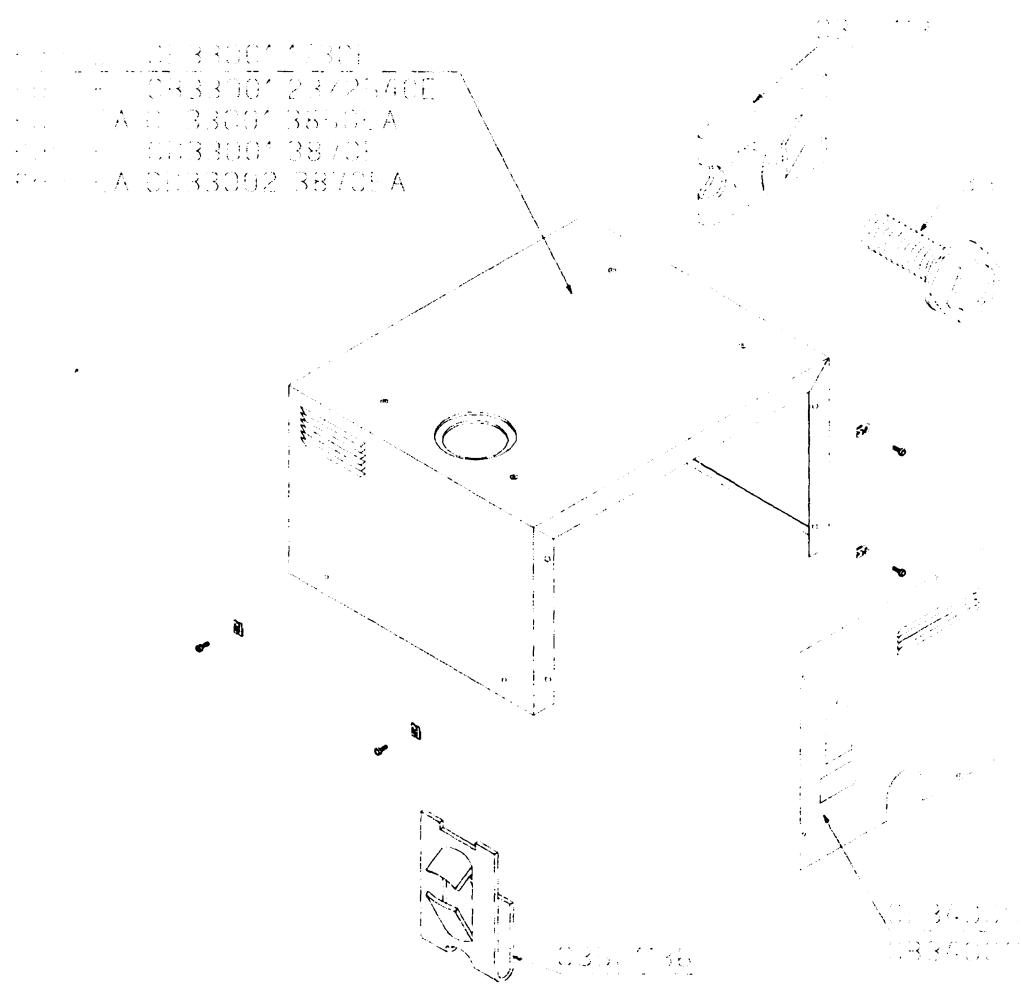
VESSEL ASSEMBLY



**DOOR TIGHTENING BOLT - ASSEMBLY (CT 220010)**

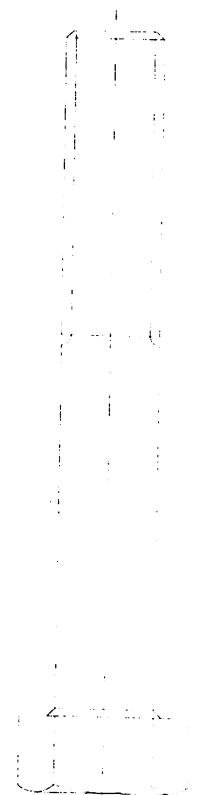
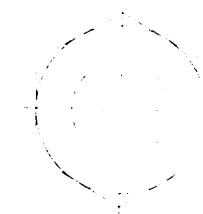


**OUTER CABINET - ASSEMBLY**



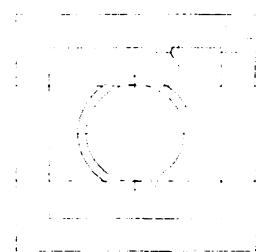
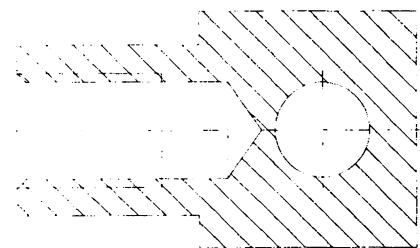
*I/2 UNC BOLT*

*FOR ALL AUTOCLAVES*  
03527001  
03527002



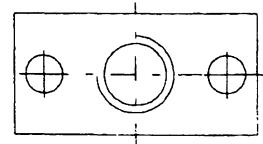
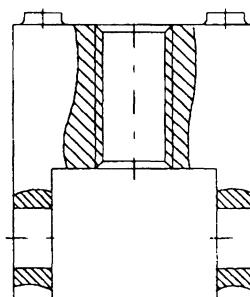
**LEFT HINGE**

**CT223010**  
**3870 CC223010**



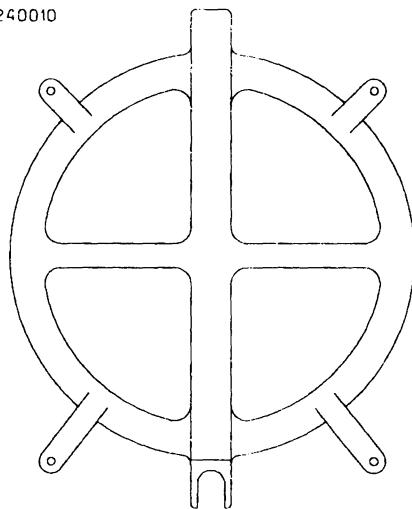
**RIGHT HINGE**

**CT 232010**



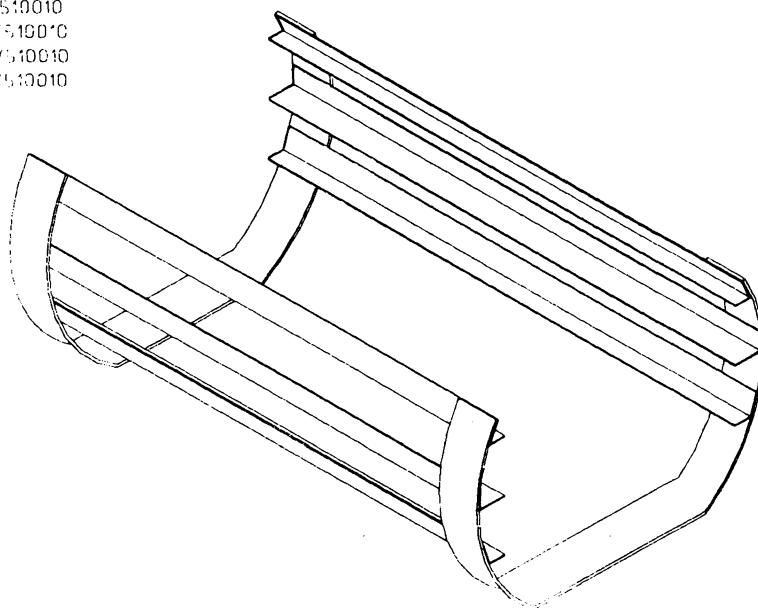
**DOOR**

1730 - CU240010  
2340 - CT240010  
2540 - CV240010  
3870 - CC240010



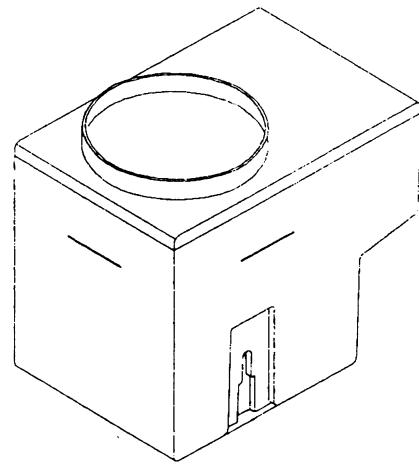
**TRAY HOLDER**

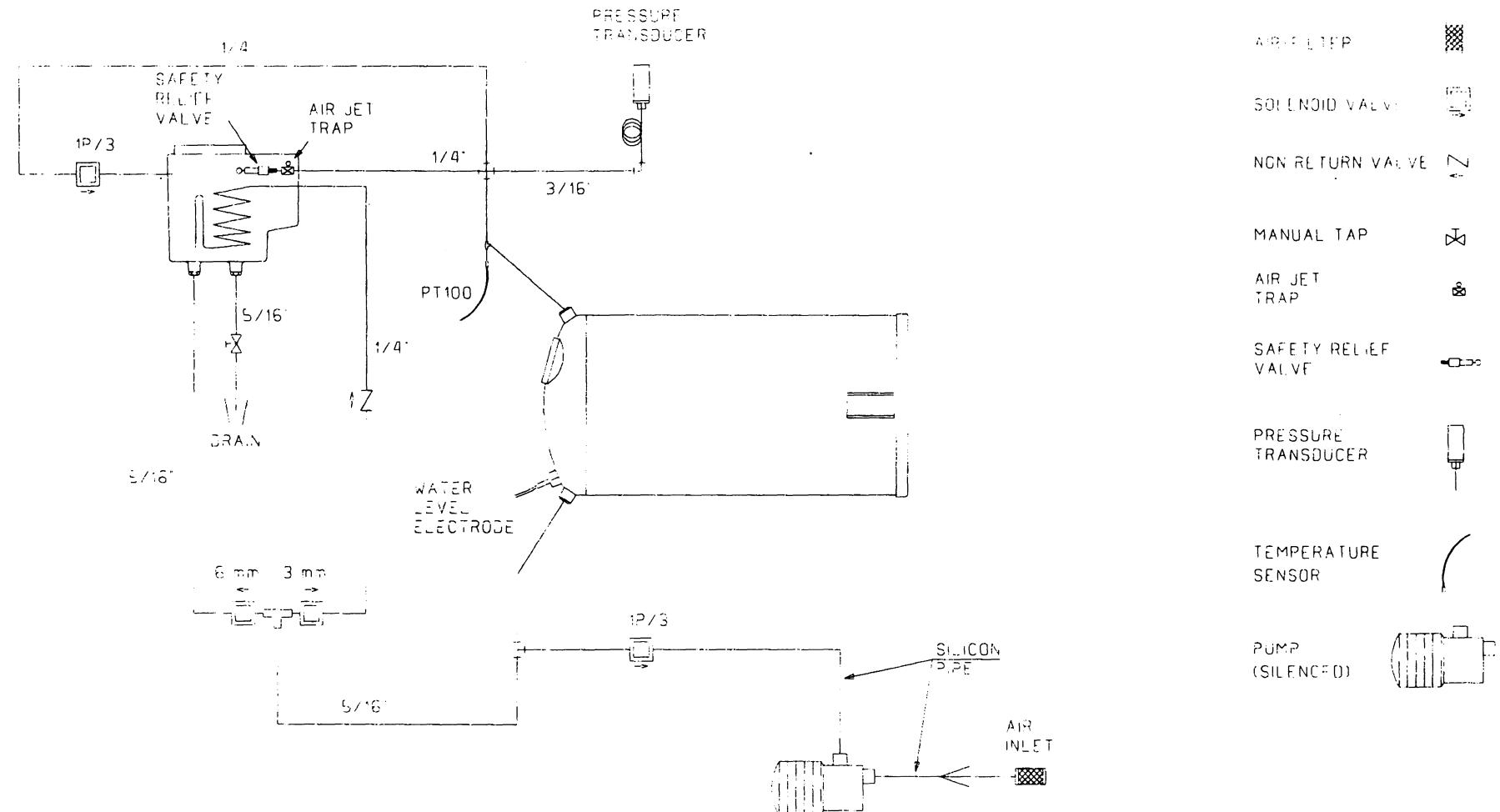
1730 - CU510010  
2340 - CT510010  
2540 - CV510010  
3870 - CC510010



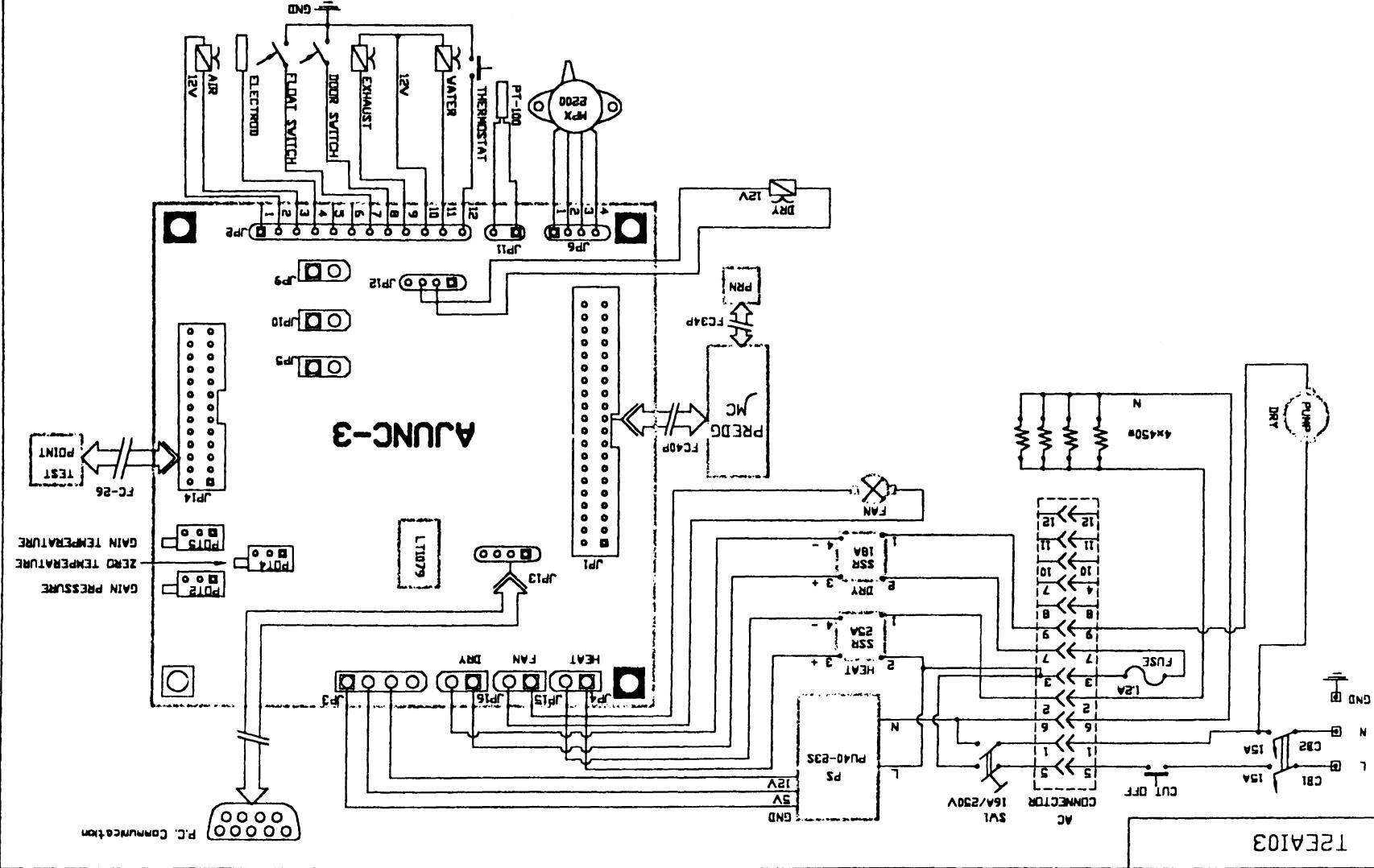
*TRAY HANDLE*

*WATER RESERVOIR*





14000 = 1000 x 1000 x 1000  
 1000 = 1000 x 1000 x 1000  
 1000 x 3 = 2340 x 2540 x 1000  
 3800 x 3870 x 1000



# USER'S INSTRUCTIONS

LINEAR-MOTOR-DRIVEN FREE PISTON SYSTEM

## AIR COMPRESSOR AC SERIES

(10~20W)

**Manufacturer :** Nitto Kohki Co., Ltd.  
2-9-4 Naka-Ikegami Ota-ku,  
Tokyo 146-8555, Japan  
Tel: 81-3-3755-1111  
Fax: 81-3-3753-8791

**Distributor :** Europe: Nitto Kohki Europe Co., Ltd.  
Unit 21, The Empire Centre  
Imperial Way, Watford  
Herts. WD2 4YH  
United Kingdom  
Tel: 44-1923-239668  
Fax: 44-1923-248815

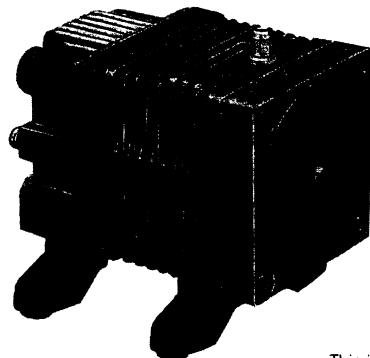
Nitto Kohki Deutschland GmbH  
Im Meissel 6  
71111 Waldenbuch  
Germany  
Tel: 49-7157-22436  
Fax: 49-7157-22437

U. S. A.: MEDO U. S. A. INC.  
4525 Turnberry Drive  
Hanover Park, IL 60103  
U.S.A.  
Tel. 1-630-924-8811  
Fax: 1-630-924-0808

LQ02786-0

Please read these operating instructions  
before using this unit.  
(Please read the back of this sheet also.)

Keep these operating instructions handy for reference when needed.



This illustration shows  
Model AC0102/AC0105



### HANDLING PROBLEMS

In any of the following cases, stop using the unit immediately and disconnect the power supply.

When you are sure it has stopped operating, consult your dealer regarding repair.

- ① If an oil such as lubricating oil has been added by mistake
- ② If the unit has suffered a severe shock such as being dropped
- ③ If a liquid such as water has been sucked by the unit
- ④ If conditions are abnormal, such as smoke, strange odor or noise

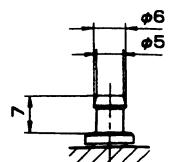
### APPLICATION

THIS UNIT IS DESIGNED TO BE INSTALLED IN  
END-USE PRODUCTS AND AVAILABLE FOR  
ATOMOSPHERIC AIR ONLY

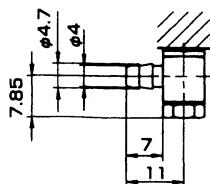
### DIMENSIONS

UNIT OF MEASURE : mm

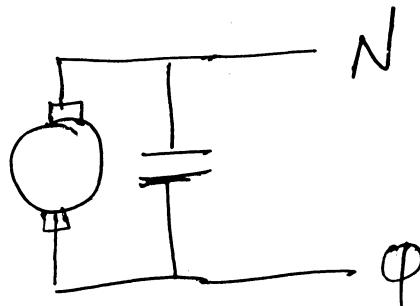
#### 〈DETAILS OF OUTLET PORT〉



MODEL AC0102  
MODEL AC0105



MODEL AC0110  
MODEL AC0207



As per Daud.

## Installation into a Device

### Installation

#### ATTENTION

Connect to earth. (Except when installed in a double-insulated device)



Not connecting to earth may cause a fire or electric shock.

#### ATTENTION

When used to produce air bubbles, etc., this unit must be installed in a position above the liquid surface.



If it is placed below the liquid surface, the liquid may flow in and cause an electric shock.

#### Avoid installation in a damp or dusty location.

Otherwise the unit will not generate its full performance and may cause a short circuit.

#### Install in a well-ventilated place.

If a poorly ventilated site can not be avoided, use a fan, etc. to provide forced air for cooling.

If the interior becomes heated, the life of the unit will be shortened.

#### Install the unit so that it does not contact surrounding objects.

Otherwise it may damage whatever it touches and the unit itself may suffer severe shock and fail to generate its full performance.

#### Install the unit so that it does not contact other objects during transportation.

If contact with surrounding objects can not be avoided, protect the unit with buffering material during transportation only. Be sure to remove the buffering material before the unit is used.

#### On installation, anti-vibration rubber feet should be fixed securely with screws.

Unless it is fixed, vibration may cause it to move.

## MAINTENANCE

#### This unit must never be oiled.

Oiling will cause a breakdown.

#### ATTENTION

This unit must not be dismantled or repaired by anyone who has not been qualified by Manufacturer.



incorrect work may cause a fire.

#### The filter should be inspected periodically and cleaned or replaced.

It is recommended to clean or replace the filter within every six months.

If the filter is stuffed with dust, etc., the unit will fail to generate its full performance.

### Filter Cleaning and Replacement

#### ATTENTION

Power must be disconnected when cleaning or replacing the filter.



Failure to do this may cause electric shock or injury.

#### When the filter has been washed, it should be dried thoroughly before being used.

If it is used wet, water will be taken in, causing a breakdown.

Refer to the diagrams on the right and clean or replace the filter in accordance with the following procedure.

#### ① Disconnect the power source.

#### ② Loosen the filter cover screw and remove the filter cover.

Be careful not to lose the components which have been removed.

#### ③ Remove the filter.

[Model AC0201A is fitted with an O-ring.]

#### ④ Tap the filter to shake out the dust.

\* If the filter is severely soiled, wash with a neutral cleanser, rinse well and dry in the shade.

\* If the filter has lost its elasticity, is split or the sponge has peeled away from the surface, its filtration will be ineffective and it should be replaced.

\* Filters should be genuine articles ordered from your dealer.

#### ⑤ Install the filter

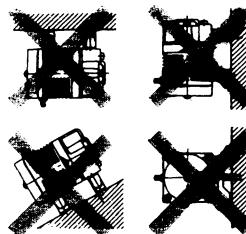
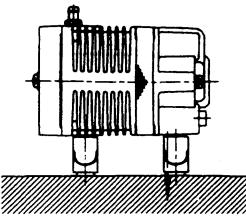
[Model AC0201A should be fitted with an O-ring.]

Be careful not to jam the filter between the body and the filter cover.

#### Tighten the filter cover screw securely.

[On Model AC0201A, make sure the O-ring does not protrude outside the filter cover.]

◎ Install the unit horizontally with its anti-vibration rubber feet down. Otherwise the unit may fail to generate its full performance.



## Connecting Lead Wires

#### ATTENTION

The lead wires to this unit or wiring to the end-use product should be connected by soldering, crimping or screwing.

An insecure connection may cause a fire or electric shock.

#### ATTENTION

Avoid placing or dropping anything on the lead wires to this unit.

The lead wires may be damaged, causing a fire or electric shock.

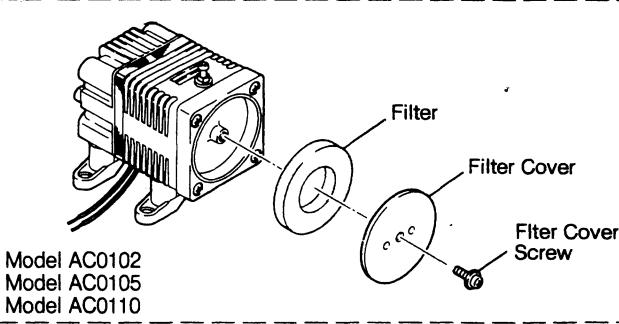
#### ATTENTION

Avoid pulling, damaging, unnecessary bending, twisting or heating of the lead wires to this unit.

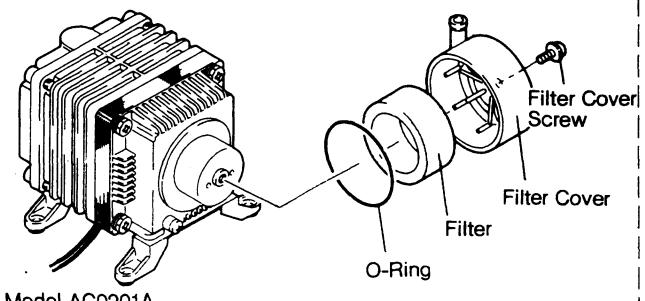
The lead wires may be damaged, causing a fire or electric shock.

#### Install lead wires so that they do not touch this unit and are not under tension.

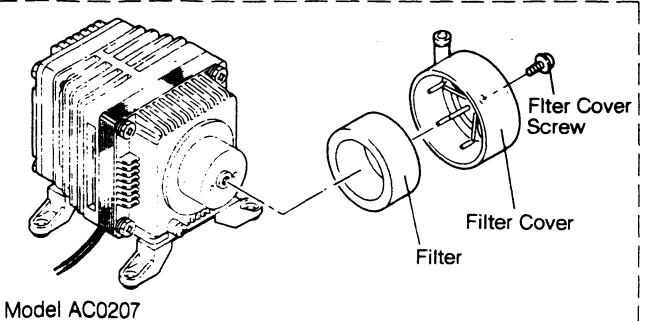
Incorrect fastening may damage the lead wires and cause a breakdown.



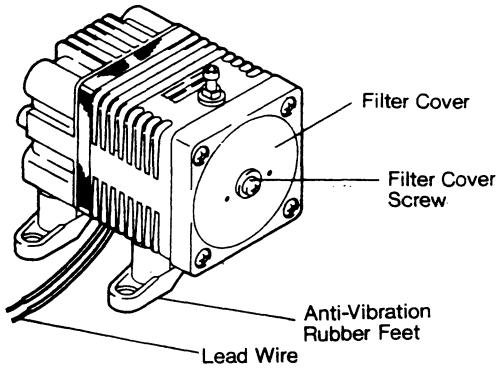
Model AC0102  
Model AC0105  
Model AC0110



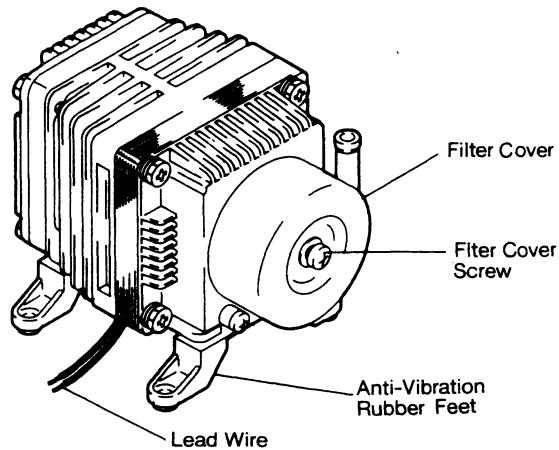
Model AC0201A



Model AC0207



This illustration shows Model AC0102/AC0105



This illustration shows Model AC0207

## SAFETY PRECAUTIONS

### Symbols and Their Meanings

The degree of injury or damage which will result if the explanations are ignored and the unit is used incorrectly are classified and explained under the following symbols.



#### WARNING

Items which may cause death or serious injury to personnel



#### ATTENTION

Items which may cause injury to personnel or physical damage

The types of items which should always be observed are classified and explained under the following symbols.

Prohibition



Prohibited



Dismantling Prohibited

Emphasis



Must be done



Must be earthed

### Items to be Noted



#### WARNING

Don't intake or eject fluids other than atmospheric  
Otherwise there is a risk of explosion, fire, electric shock.



Avoid intrusion of water or contact with water.

Otherwise there is a risk of fire or electric shock due to a short circuit.



#### ATTENTION

Don't enclose the unit in an airtight case (box).

Otherwise it may cause a fire or electric shock.

Don't place combustible material near this unit.

Otherwise it may cause a fire.

This unit must be installed in a end-use product.

Otherwise it may cause a fire, electric shock or burns.

Don't touch the unit direct with bare hands during or immediately after operation.

Otherwise it may cause burns.

Don't use the power supply voltage other than that shown on this unit.

Otherwise it may cause a fire or electric shock.

Store the unit in dry area.

Storage in damp area may cause rust or corrosion and the unit will not generate full performance.

Use this unit in an environmental temperature within the indicated range.

If used outside the temperature range, it may cause a fire or electric shock.

This unit must not be modified.

Otherwise it may cause a fire or electric shock.

Don't give the unit an external shock during storage and transportation.

External shock to the unit may cause malfunction of the unit.

Should be earthed.  
(Except when installed in a double-insulated device)

If not earthed, it may cause a fire or electric shock.

For any possible ingress by such as liquid, vapor, powder or dust, install an adequate filter to stop drawing them in.

Otherwise it may cause electric shock.

Avoid placing or dropping anything on the lead wires to this unit.

The lead wires may be damaged, causing a fire or electric shock.

Avoid pulling, damaging, unnecessary bending,

twisting or heating of the lead wires to this unit.

The lead wires may be damaged, causing a fire or electric shock.

The lead wires to this unit or

wiring to the end-use product should be connected securely by soldering, crimping or screwing. An insecure connection may cause a fire or electric shock.

This unit must not be dis-

mantled or repaired by anyone who is not qualified by Manufacturer. Incorrect work may cause a fire.

Power must be disconnected when cleaning or replacing the filter.

Failure to do this may cause electric shock or injury.

## SPECIFICATIONS

### DW PRESSURE COMPRESSORS

Item Model	Rated Pressure Mpa [kgf/cm <sup>2</sup> ]	Rated Airflow (ℓ/min)	Duty Cycle	Life Expectancy (h)	Noise Level (dBA)	Gross Weight (kg)	Rated Voltage (V)	Rated Frequency (Hz)	Power Consumption (W)	Max. Current (A)
AC0102	0.02(0.2)	5	Continuous	3,000	40	0.7	AC115 AC230	60 50/60	14 15/14	0.31 0.19/0.17
AC0201A	0.01(0.1)	20	Continuous	6,000	50	1.5	AC115 AC230	60 50/60	19 23/19	0.66 0.39/0.33

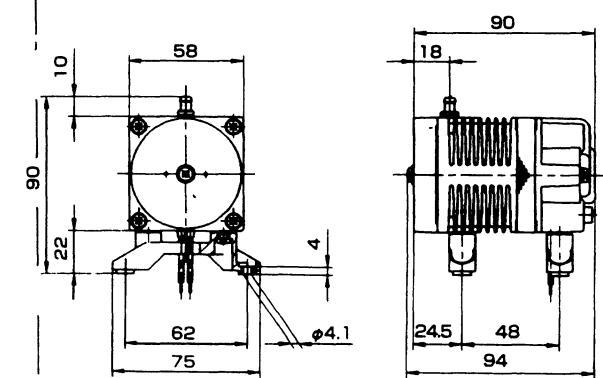
### INTERMEDIATE PRESSURE COMPRESSORS

Item Model	Rated Pressure Mpa [kgf/cm <sup>2</sup> ]	Rated Airflow (ℓ/min)	Duty Cycle	Life Expectancy (h)	Noise Level (dBA)	Gross Weight (kg)	Rated Voltage (V)	Rated Frequency (Hz)	Power Consumption (W)	Max. Current (A)
AC0105	0.05(0.5)	2.5	60 Minutes	3,000	40	0.7	AC115 AC230	60 50/60	14 15/14	0.31 0.18/0.16
AC0110	0.1 (1.0)	0.8	30 Minutes	3,000	40	0.7	AC115 AC230	60 50/60	12 15/12	0.31 0.18/0.16
AC0207	0.07(0.7)	3.5	Continuous	3,000	50	1.7	AC115 AC230	60 50/60	20 25/20	0.66 0.39/0.36

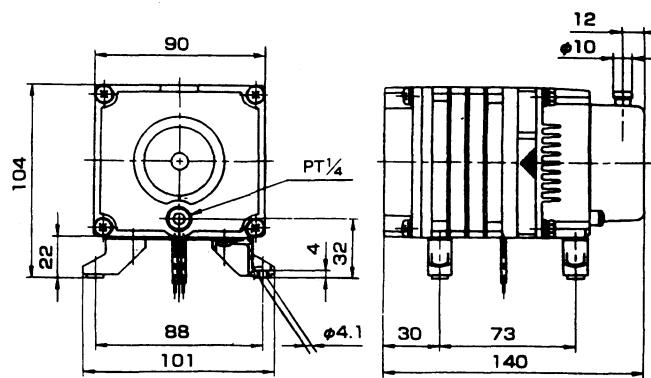
- ④ Duty cycle means the expected time required for the various components to reach the upper design temperature limit. This will vary according to the ambient temperature.
- ⑤ Life expectancy means the total accumulated time over which the unit can be used without repair (other than filter maintenance). This indicates the expected time required for the air flow to fall to 80% of the specification value when operated at the rated voltage and frequency and rated pressures. Life expectancy will vary according to usage conditions (such as working pressure and environment).
- ⑥ Rated air flow, power consumption, and max current are measured at the rated pressure, voltage and frequency, and converted into numerical value at environmental condition of 20°C, absolute atmospheric pressure 101.3 kPa and relative humidity 65%.
- ⑦ The environment for using this unit is a temperature of 0 to 40°C and humidity of 30 to 85%.
- ⑧ Waterdrops produced by condensed air may be staying in the intermediate pressure unit. Drain the water regularly through drain port which is situated at the bottom of the unit.

MODEL AC0102

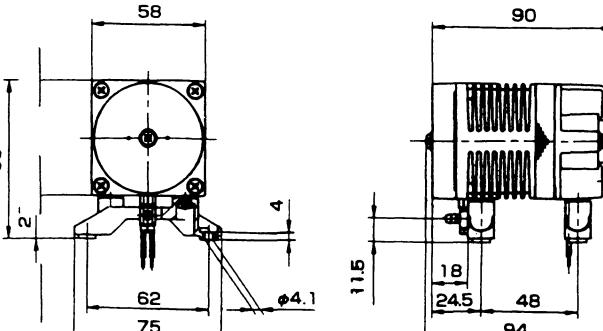
MODEL AC0105



MODEL AC0201A



MODEL AC0110



MODEL AC0207

